NETWORK WORLD
THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING
AN INTERNATIONAL DATA GROUP PUBLICATION ◆ VOLUME 10, NUMBER 50 ◆ DECEMBER 13, 1993

Irate users raise the roof at DECUS

BY JIM DUFFY

San Francisco

Digital Equipment Corp. users last week fired off a litany of concerns to company officials concerning the planned migration of DEC's Polycenter Framework management product to an IBM-developed platform.

At the Digital Equipment Computer Users Society (DECUS) conference, several of DEC's largest users – including Dow Chemical Co., Eastman Kodak Co., the U.S. Department of Defense, Hershey Foods Corp. and Mitre Corp. – told company officials they want assurances that migrating to the new Polycenter NetView product will be worth their time, effort and expense.

See DEC, *page 6*

IBM unplugs for 1994

Wireless, high-speed LAN tools to lead product push next year.

BY MICHAEL COONEY

New York

IBM executives at a Networking Update briefing here last week outlined plans to announce next year wireless and high-speed LAN offerings, software distribution wares for the AIX/6000 platform and more multivendor LAN management features for the NetView/6000 management platform.

The executives also detailed for the first time pricing for IBM's forthcoming Asynchronous Transfer Mode (ATM) products and announced that the company will port its CICS transaction processing software to Novell, Inc. NetWare environments.

"We see many of the products we'll be announcing in 1994, particularly ATM and wireless, expanding the role of networks," said James Boyle, vice president of IBM wide-area networking technologies.

IBM's 1994 menu of products

- New family of wireless products, including LAN and WAN adapters.
- Asynchronous Transfer Mode adapters.
- 100M bit/sec Token Ring.
- Token-Ring switching module for 8250 LAN hub.
- New 8209 LAN Bridge.
- NetView Distribution Manager support for the AIX/6000 operating system.
- LAN Network Manager and LAN Management Utilities for the NetView/6000 management platform.
- CICS on Novell, Inc. NetWare LANs.

GRAPHIC BY BERTHA A. SUAREZ

WIRELESS THRUST

Users will see a family of wireless personal computer network adapters sometime in the first quarter, Boyle said. These products will include one local- and two wide-area network adapters, software to support the adapters and an application for the NetView/6000 platform to manage the new products.

One of the WAN adapters will allow access to public services, such as the ARDIS Co. wireless network, while the other will support Cellular Digital Packet Data, an emerging 19.2K bit/sec wireless data standard.

"With the wireless components in place, IBM will be able to develop more

See IBM, *page 66*

Cabletron shows off future hub

BY SKIP MACASKILL

Rochester, N.H.

Cabletron Systems, Inc. is putting the finishing touches on its next-generation hub that features a multigigabit backplane and a distributed processing architecture that eliminates the need for dedicated net management, routing and switching modules.

In a far-ranging interview with *Network World* last week, Michael Skubisz, director of product marketing for Cabletron, provided details on the architecture and management of the new LAN Builder hub, which will be unveiled next quarter.

The 14-slot device will support

See Cabletron, *page 66*

MCI envisions array of value-added services

Offerings to complement carrier's data services.

BY BILL BURCH

Dallas

In a strategy briefing here, MCI Communications Corp. officials said the carrier is drafting plans to provide a broad range of value-added services, such as software distribution, multimedia conferencing and disaster recovery, to complement its data network offerings.

The value-added services fall under three broad headings – protocol, application and professional services – and will augment MCI's private-line, switched data and HyperStream network services. HyperStream includes frame relay, Switched Multimegabit Data Service and, ultimately, Asynchronous Transfer Mode.

Paul Weichselbaum, vice president of data product marketing, said the protocol transport services MCI is exploring would aid users with Transmission Control Protocol/Internet Protocol, Novell, Inc. Internetwork Packet Exchange (IPX) and IBM Advanced Peer-to-Peer Networking (APPN) nets.

In the realm of applications services, MCI already offers messaging, among other things, but is considering such other services as electronic directories, data storage and retrieval, and software distribution. Professional

See MCI, *page 66*

MCI's service hierarchy

Element services:
Private lines, switched data, etc.

Network services:
ATM, SMDS, frame relay

Protocol services:
IP, IPX, APPN

Application services:
Videoconferencing, messaging, etc.

Professional services:
LAN and data center management, etc.

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STANDARDS UPDATE

Users set to take DCE live, despite DME's apparent demise

BY JIM DUFFY

Like other users, Mead Data Central, Inc. next year will begin injecting the Open Software Foundation, Inc.'s (OSF) DCE code into its network.

After two years of successful piloting and prototyping, Mead Data is now ready to put the Distributed Computing Environment to the test by using it in its NEXIS and LEXIS service network, hoping to benefit from improved application performance made possible by using different brands of computers working across the net to solve compute-intensive tasks.

"We have had zero problems with interoperability," says Peter Torvik, Mead Data director of delivery systems architecture. "I have to give it a completely clean bill of health on the interoperability score."

TORVIK

But there remains a pall over DCE users such as Mead Data: the lack of sufficient tools to manage and administer DCE networks. A dearth of management tools could slow cross-enterprise deployment of the DCE because there is no way to control operations.

That pall, meanwhile, has taken on a more ominous aspect, given the moribund state of the OSF's Distributed Management Environment (DME). DME was to have provided a vendor-neutral, object-oriented environment for managing the networks and systems that make up a distributed computing environment.

Although independent of OSF's DCE activities, DME was to be the perfect complement to DCE as a means to ensure that multivendor components of a distributed environment operate at peak levels.

—Six out of 10—
Network World *readers in a recent survey said they will require vendors to support the DCE next year to ensure interoperability.*

But after months of watching OSF fumble with the DME's most important technological component – an object-oriented management framework – and listening to OSF mumble different delivery dates for its release, many have left the DME for dead (*NW*, Nov. 22, page 15).

Indeed, OSF's DCE and DME technologies are heading in opposite directions.

OSF says more than 25 users will cut over to DCE production code early next year.

But OSF has scrapped plans to develop DME's object-oriented management framework. Instead, it will produce code that many vendors already have and few will likely license.

Continued on page 47

Briefs

IBM sniffs out viruses. IBM last week began shipping an enhanced version of its antivirus software that includes support for Novell, Inc. NetWare local-area network servers. IBM AntiVirus Version 1.04 can detect more than 2,000 known viruses on NetWare servers as well as DOS, Windows and OS/2 machines. If the software detects a virus, it locks up the affected user to prevent the infection from spreading. Single copies are available for $29.95 by calling (800) 551-3579.

Int'l calls on the rise. A Federal Communications Commission report on international voice and data services released last week shows U.S. carriers billed about $10.9 billion for international services in 1992, up about $1 billion from 1991. In the U.S., customers made about 1.7 billion international calls in 1992 and received about 1.1 billion international calls.

Order up a LAN. The IBM Personal Computer Co. last week announced it will sell turnkey local-area networks through its IBM Direct order line. The new Net Select service will let customers order hardware, software, desktop and network operating systems, LAN adapters, peripherals, and LAN service and support over the phone by calling (800) 426-2968.

Tool time. Network General Corp. last week announced it has signed an agreement to purchase privately held ProTools, Inc., a vendor of network monitoring and troubleshooting tools in Beaverton, Ore. According to industry analysts, ProTools troubleshooting applications will fit well with Network General's line of software-based network analysis tools such as its Sniffer line. The deal, valued in the $32 million range, is expected to be finalized by the end of next month.

Racal to embrace PCI. Racal InterLan this week is expected to announce a Peripheral Component Interconnect (PCI)-based Ethernet network interface card, which the company claims will be one of the first PCI adapters to hit the market when it comes out in March 1994. PCI is a new high-speed 32- or 64-bit local bus standard developed by Intel Corp. that allows a desktop device to process data 16 times faster than Industry Standard Architecture (ISA)-based devices and four times faster than existing Extended ISA machines. Racal InterLan's card is designed for high-end personal computers and workstations such as those with Intel 486 and Pentium chips and the PowerPC developed by IBM and Apple Computer, Inc.

Revving up Ethernet. The IEEE 802.3 committee last week established a new 100Base-T task force to scale the 10Base-T Ethernet local net standard from 10M to 100M bit/sec. The new task force has selected two complementary transmission methods: two-pair, which is based on the existing 100Base-X proposal; and four-pair, which is based on a new proposal, dubbed 4T+, that extends traditional 10Base-T two-pair signaling to four-pair operation at 100M bit/sec over voice-grade cabling. Proposed draft specifications for both transmission methods are expected to be completed by next month.

Objectively speaking. At least 10 companies and organizations last week told the Object Management Group (OMG) they will submit proposals for Version 2.0 of the OMG's Common Object Request Broker Architecture (CORBA) distributed object-oriented programming specification. AT&T, Digital Equipment Corp., Expersoft Corp., Hewlett-Packard Co., HyperDesk Corp., IBM, International Computers, Ltd, Iona Technologies, Inc., the Open Software Foundation, Inc. and SunSoft, Inc. have until March to actually submit proposed CORBA 2.0 specifications. OMG, based in Framingham, Mass., hopes to choose one by mid-1994.

Contacts

ADDRESS: Network World, 161 Worcester Rd., Framingham, MA 01701. PHONE: (508) 875-6400; FAX: (508) 820-3467; INTERNET: network@world.std.com.; BBS: Interact with other readers: download free software, submit letters to the editor, leave news tips, change of address requests or hunt for jobs by using your IBM, Apple or other computer to dial into the BBS at speeds up to 9.6K bit/sec by dialing (508) 620-1178 or (508) 620-1160. READER ADVOCACY FORCE (R.A.F.) HOTLINE: Contact us with story tips about pressing user issues, (800) 622-1108, Ext. 487; NETWORK HELP DESK: Contact Dana Thorat via any of the above means.

Network HELP desk

Network World *tracks down answers to your questions regarding products, services, technologies or disputes with vendors. Please submit questions to Dana Thorat at (800) 622-1108, via fax at (508) 820-3467, via the Internet at djt@world.std.com or via CompuServe at 73244,2673.*

Our company has two electronic mail packages that run on two different Unix machines attached to an Ethernet. One package supports a Transport Protocol 4 (TP4) capability and the other uses TP0. How can we get the two packages to exchange data?

Chuck Woodall, Sierra Vista, Ariz.

Tom Nolle, president of CIMI Corp., a technology assessment firm in Voorhees, N.J., replies:

First, you need to be sure that your two mail packages use the same high-level mail protocol — like X.400. Fixing your transport-layer incompatibility won't help if the mail systems themselves are incompatible.

TP0 and TP4 are two classes of the Open Systems Interconnection transport layer. And since most E-mail systems offer more than just one OSI transport protocol, I suggest contacting both of your E-mail software vendors to find out if either package will support other transport classes.

If so, change one of the two systems so that both operate using a common transport class. Generally, you should use higher numbered transport classes on networks that have lower quality links; most OSI products tend to use Class 4 so it might be the best one on which to standardize.

If you find there is no common transport protocol class for the two packages, there are two other options. First, change the OSI protocol software in one or both of your systems to a product that supports a common transport class. Second, find an X.400 message handling software package that will work on any system you have and which also supports both TP0 and TP4. You should be able to get a list of third-party protocol and E-mail software from your equipment vendors. You can also call UniForum at (408) 986-8840 to get a copy of its annual *Open Systems Product Directory*. The directory costs $95.

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Patent dispute could shoot down U.S. Air Force's new message net

BY ELLEN MESSMER

Washington, D.C.

A massive military network project set to go up for bid by year end is in ''legal jeopardy'' due to an unresolved patent dispute over encryption technology, government officials warned last week.

The Defense Message System (DMS) net, which would serve nearly one million users, will replace the military's decade-old Automated Digital Information Network worldwide. However, the encryption technology slated for use in the DMS is the subject of a long-running battle between the government and Public Key Partners, Inc. (PKP), which holds important encryption patents for public-key management, encryption and digital signatures.

McNULTY

PKP claims that the proposed Digital Signature Standard (DSS) put forward by the National Institute of Standards and Technology (NIST) in 1991 infringes on public-key patents held by RSA Data Security, Inc. and German professor Claus Schnorr, both represented by PKP. Digital signatures let users electronically sign documents and assure they are received without tampering.

The National Security Agency indicated that the Department of Defense will seek bids this week to buy as many as 70,000 PCMCIA cards containing the key-escrow Capstone public-key encryption chipsets using public-key encryption and the DSS. The second part of the DMS bid, for a military-specific version of X.400 and X.500, will be issued by Dec. 29.

The Department of Commerce, failing for two years to vanquish the legal challenge from PKP, last summer said it would hand over an exclusive license for DSS to PKP to resolve the dispute. But over a hundred companies, including AT&T, IBM, Citibank, N.A. and the Bell companies, condemned the plan as illegal, and NIST said last week DSS is now on hold.

''The fact that we have no standard would mean [the DMS] is in somewhat of a risk from a legal standpoint,'' said Lynn McNulty, associate director of the computer systems security division at NIST in a presentation last week before the Computer Systems Security and Privacy Advisory Board.

McNulty added that the proposed licensing arrangement, which received hundreds of negative comments, is also opposed by the European Community and the Canadian government.

The deal would allow PKP to charge $1 for each public-key certificate issued using DSS.

''We made our position clear,'' said Jim Bidzos, president of RSA Data about the DSS issue. ''We made NIST an offer, and it's up the them. We reserve the right to assert our patent rights if necessary.''

PKP Attorney Robert Fougner, who met with Commerce officials last week, said negotiations are still in progress, but no agreement has been reached.

Last week, neither the Air Force nor the Defense Department were prepared to say whether the patent problem would delay the DMS procurement.

The U.S. government has other projects underway using DSS, said Santosh Chokhani, member of the technical staff at Mitre Corp., which just completed a study for a public-key infrastructure plan for the government.

For example, DSS is planned for use by the Internal Revenue Service for tax filings and the Federal Aviation Administration for airmen's medical certificates.

T3plus offers high-end inverse mux

BY MAUREEN MOLLOY

Santa Clara, Calif.

T3plus Networking, Inc. will unveil at ComNet '94 next month an inverse multiplexer that will let users aggregate 1.54M bit/sec T-1 circuits to support high-bandwidth applications or back up a T-3 backbone network.

The new BMX45 Multimegabit Inverse Multiplexer provides a so-called middleband alternative for users with bandwidth needs greater than T-1 but that do not need the full capacity of a 45M bit/sec T-3 circuit.

Michael Zboray, program director at Gartner Group in Stamford, Conn., said inverse multiplexing at super T-1 rates provides significantly greater benefits than inverse muxing at sub-T-1 rates.

''There's all kinds of ways to get increased bandwidth between 56K and T-1. But getting between T-1 and T-3 rates almost by definition requires some sort of plant modification. This product will eliminate that,'' he said.

Inverse muxing today is usually used to bundle 56/64K bit/sec circuits into larger pipes. The new BMX45 Multimegabit Inverse Multiplexer goes beyond that by letting users aggregate as many as 28 T-1 circuits.

That aids, for example, in T-3 network backup, which normally requires installation of another costly T-3 circuit.

The device comes with a built-in channel service unit and can be configured using T3plus' Simple Network Management Protocol or Unix-based BMXview network management system.

UPDATING BANDWIDTH

The new mux will also be outfitted with dynamic bandwidth capabilities that will let users add or delete circuits based on application needs and traffic priorities. For example, if a trunk failure occurs, the BMX45 will reduce the bandwidth allocated to lower priority applications to accommodate high-priority applications.

Thang Tran, a network services engineer at Southern California Edison Co. in Irvine, Calif., said the BMX45 will let him back up his T-3 backbone network with T-1 circuits and provide multimegabit circuits to remote locations, where the cost of T-3 links is prohibitive.

Southern California Edison now has a T-3 net based on T3plus' existing BMX45 Broadband Switch T-3 multiplexers to link its engineering group in Irvine to other users at its Nuclear Generating Station in San Clemente, Calif.

''When we put in the T-3 backbone, we wanted to back it up because we have a lot of critical graphics applications running over the network. But purchasing an idle T-3 for backup isn't cost-effective,'' he said. ''Now we can use the inverse mux to back up our network with a few T-1 lines.''

Zboray said multimegabit inverse muxes will become more desirable with the advent of wide-scale deployment of Asychronous Transfer Mode-based networks.

''Users are not automatically going to go for a T-3 connection. There's hard economic choices to be made in the WAN. Users are going to grab the bandwidth they need and not a bit more,'' he said.

The BMX45 will be available in the first quarter of next year. Pricing has not been set but the device is expected to priced below $20,000, the vendor said.

©T3plus: (408) 727-4545.

AT&T ready to offer 155M bit/sec service

BY ELLEN MESSMER

Basking Ridge, N.J.

AT&T early next year will roll out a 155M bit/sec Synchronous Optical Network (SONET) service, becoming the first long-distance carrier to offer such high-speed private lines on a nationwide basis.

The company's first customer for the service will likely be Comdisco Disaster Recovery Services, Inc., which has been beta-testing the SONET service between its Chicago and New Jersey disaster recovery ''hot sites'' for the last few months.

AT&T acknowledged that the demand for such high-speed SONET service will not be overwhelming. ''This is an emerging service with fairly limited demand initially,'' said Hemant Vaidya, product-line manager for AT&T's Accunet high-speed services.

Fat pipes

AT&T's new 155M bit/sec Synchronous Optical Network offering addresses transmission speeds above 45M bit/sec T-3 facilities. The carrier's recently announced Asynchronous Transfer Mode service is offered at T-1 and T-3 speeds, but can scale up to 155M and 622M bit/sec.

But with the 155M bit/sec service apt to cost about 15% less than comparable bandwith achieved using multiple T-3 lines, customers requiring such high bandwidth are certain to investigate it.

For instance, an AT&T T-45 line from Cincinnati to Denver costs about $70,000 per month. It would take nearly four of them at $280,000 per month to equal a 155M bit/sec SONET link, which is expected to cost somewhere between $207,000 and $219,000 per month.

THE SERVICE

Vaidya said AT&T will file for the SONET service under its Tariff 9 at the Federal Communications Commission, but FCC rules also give it the option to negotiate SONET network deals on an individual contract basis or offer it through Tariff 12.

The service will not be offered using AT&T's DDM-2000 SONET switch, but rather a proprietary switch interface unit that accepts four T-3 lines outputs a single SONET Optical Carrier (OC)-3 trunk signal.

''The DDM-2000 is not widely deployed in our network,'' Vaidya said. ''This allows us to make use of our installed base and our T-3 Fast Automatic Restoration service.'' FASTAR lets AT&T route around failed fiber links in a matter of minutes instead of hours.

The SONET announcement follows on the heels of AT&T's Asynchronous Transfer Mode (ATM) service. As released, the ATM service will support 1.54M bit/secT-1 and 45M bit/sec T-3 speeds, but can be scaled up to 155M and 622M bit/sec and higher speeds in the future.

Basically, ATM rides over T-1, T-3 or SONET facilities, adding ATM-standard controls such as framing, formatting, signaling and addressing. With SONET facilities, users simply get a circuit-switched, high-capacity pipe; they have to add the multiplexers and proprietary protocols needed to control the links.

COMDISCO

Comdisco has already tested the service and is interested in using it to link company sites that are supported by 622M bit/sec (OC-12) local-access rings operated by Ameritech and Bell Atlantic Corp.

Comdisco hot sites in the two New Jersey towns of Carlstadt and North Bergen are on a SONET ring linking nine central offices, while Comdisco's Chicago hot site is on an Ameritech ring linking seven central offices.

Using network management controls, Comdisco can dynamically shift customer traffic where and when needed. ''I can provision the customer to my premises or elsewhere,'' said John Sandburg, vice president of networking products and services.

Early next year, Comdisco will connect the New Jersey SONET ring to one in New York City provided by Metropolitan Fiber Systems, Inc. in order to extend high-speed network links directly to the premise of financial institution customers.

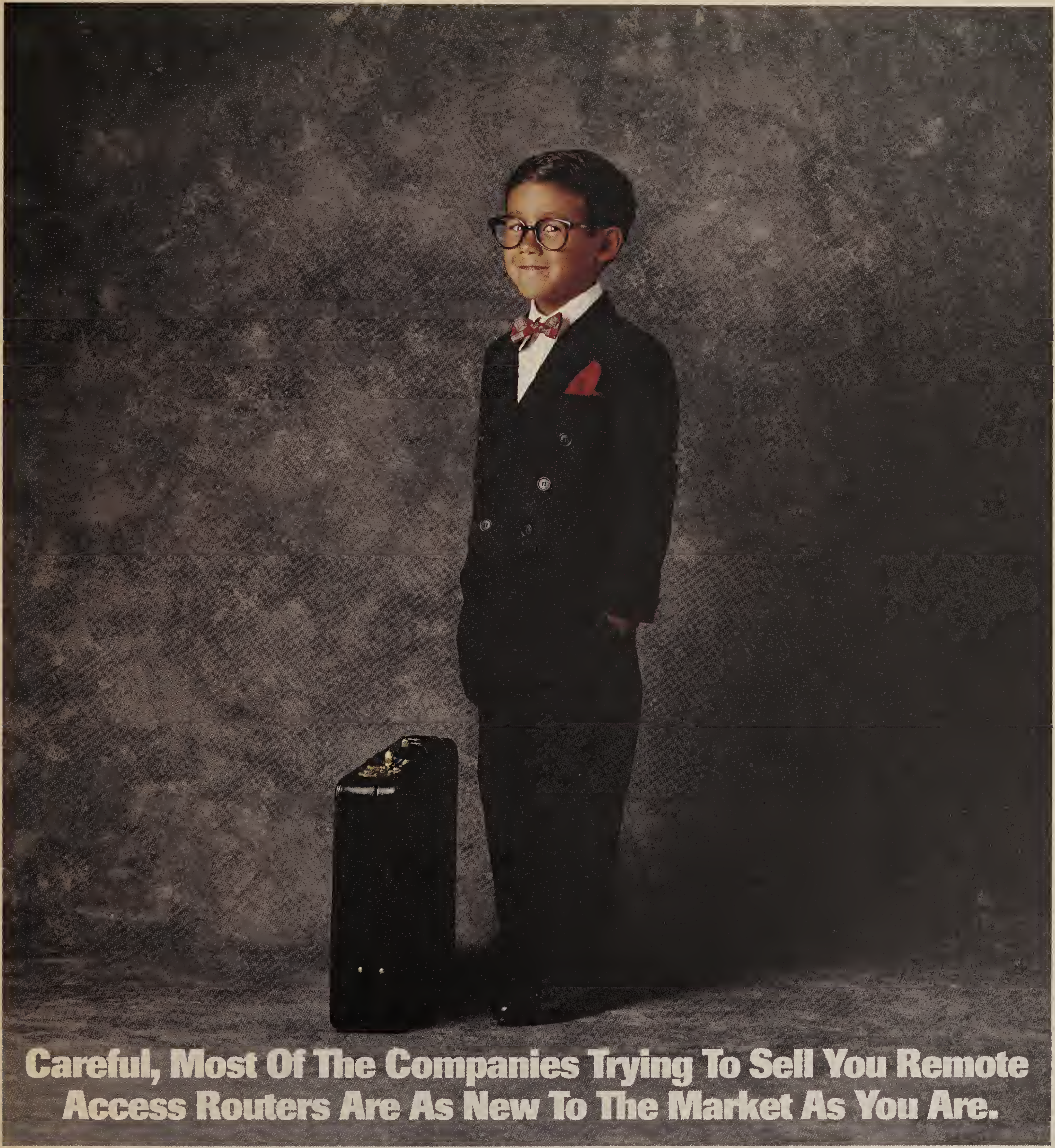
Comdisco uses multiple T-3 lines to transport traffic between Chicago and New Jersey today, but AT&T's 155M bit/sec SONET service promises significant cost savings.

''It's cost-justifiable with only two T-3 lines,'' Sandburg said, alluding to price discussions Comdisco is holding with AT&T. Sandburg said nationwide service availability is important since Comdisco plans expansion of its SONET-based disaster recovery service next year.

Tom Nolle, president of Voorhees, N.J.-based consultancy CIMI Corp., said only a handful of companies appear to need OC-3 capacity today, and those that do, such as Bear Stearns & Co. in New York, primarily use it in metropolitan networks. ''The big issue is cost,'' Nolle said.

While not all the local exchange carriers (LEC) have announced SONET rings, users interested in the AT&T 155M bit/sec service should not find it hard to convince LECs to install central office gear to reach an AT&T SONET point of presence.

''The cost will be so high, they could buy the cross-connect just for you,'' Nolle said.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More from Lotusphere

Lotus Development Corp. used its first Lotusphere conference for Notes developers last week to announce a series of product rollouts over the next 6 to 12 months. They include:

Notes Visual Programmer
A tool similar to Visual Basic for creating Notes-based applications that can be linked to relational databases and report generators. Formerly code-named Notebook. Due out by mid-1994.

LotusScript
Another Visual Basic-like tool for creating applications that integrate components of various Lotus products, including Notes and its other desktop applications. Can be used instead of the company's present macros and will communicate with Visual Basic. A version is already included with the Improv spreadsheet program for Windows. Other versions will be shipped with existing Lotus desktop products.

Lotus Forms
Will allow creation of forms to link fields in Notes documents with fields in other Lotus applications and will have some work flow capability. Due in early 1994.

Lotus Notes Video
Better integration of multimedia applications with Notes. Expected out third-quarter 1994.

Notes Bridge
Software that will let Notes servers exchange data at event- or time-based intervals. No release date set.

SOURCE: LOTUS DEVELOPMENT CORP., CAMBRIDGE, MASS.
GRAPHIC BY BERTHA A. SUAREZ

GROUPWARE

Lotus preps Notes Version 4.0

BY ADAM GAFFIN

Orlando, Fla.

Lotus Development Corp. last week outlined sweeping changes for the next major version of its Notes groupware product, including a simplified user interface, better support for mobile users and easier to use tools for linking Notes with other applications.

Notes Version 4.0, which Lotus hopes to ship by the end of 1994, will also incorporate support for Microsoft Corp.'s Object Linking and Embedding (OLE) 2.0, which will allow for more sophisticated compound documents, according to Jeff Papows, vice president of the Notes Product Division, and John Bartlett, Notes product manager.

At its first Lotusphere development conference here, Lotus also announced a series of enhancements to the existing Version 3.0, released in March. Version 3.1, with improved Windows, Macintosh and Transmission Control Protocol/Internet Protocol support, should ship in January, the company said.

Version 4.0, meanwhile, will bring "a major menu cleanup" in the user interface that will include a reduction in the number of dialog boxes and new ways for users to quickly gain information about particular objects or documents, Papows said.

"Notes has this problem with 'Window-itis,' " Bartlett said.

Papows and Bartlett said Lotus is working to simplify mobile connections with Notes databases, in part by reducing the number of steps a user must go through to transfer data to a laptop or mobile computer. The company is considering adding facilities that will let such users call up different databases on their laptops with the click of a mouse.

The new Notes will feature transparent remote access to network servers so a mobile user can dial into a local network just once to retrieve data that might be stored on several servers.

The company will also try to incorporate improved facilities for handling new data types, such as video snippets, as it tries to make Notes into a networked multimedia platform. This will include work to synchronize video and audio data to allow for LAN-based video broadcasts, Bartlett said.

He acknowledged that there are user complaints about Notes' relatively primitive printing and report-generating abilities. He said the most likely solution would be tighter integration with OLE-based applications, such as Lotus' desktop programs, to let users more easily export Notes documents and data to them.

The company will try to incorporate improved facilities for handling new data types.

"We don't want to turn Notes into a full-fledged word processor," Bartlett said.

John Landry, Lotus's chief technologist, said the company is working on a Notes-based application suite similar to its existing SmartSuite package of desktop applications.

A variety of tools, including Visual Basic-like programs, will let developers and end users create their own applications more easily and link them to SQL databases and legacy systems, Papows and Bartlett said. Several third-party developers used Lotusphere to announce similar tools. In all, more than 70 new applications were announced, either using Notes as a development platform or linking it to other types of databases and computer systems.

Gary Clare, the incoming president of the Worldwide Association of Lotus Notes Users and Technologists, said the changes generally sounded like good ones.

But Clare, responsible for rolling out Notes at the New York-based Coopers & Lybrand accounting firm, said he does not relish the idea of installing a new version and then retraining 5,000 to 6,000 users. He said the company only recently finished upgrading from Notes Version 2.0.

"It was kind of traumatic," Clare said, although part of the difficulty was related to other changes the company was making in its computer systems.

Meanwhile, according to Lotus, users can expect to see improvements in the current Notes version. Version 3.1, due out next month, will let Windows and Macintosh clients communicate with servers using TCP/IP transports. AppleTalk 2.1 support for OS/2 Notes servers will be added, as will support for cc:Mail from Macintosh clients. The company is also planning a NetWare Loadable Module version of its Notes server software.

Company officials said they also plan to release within a few weeks client and server versions of Notes for the Solaris 1.1 version of Unix, several months behind schedule. By mid-1994, they said, the firm will ship Notes for other Unix variants, including AIX, HP-UX, SCO Unix and, finally, Solaris 2.0.

Papows said Lotus plans to ship a Windows NT server version by mid-1994. Bartlett said the company is working on 32-bit versions of Notes for OS/2 clients and servers, as well as on software to allow Notes replication and mail routing over Systems Network Architecture and X.25 nets.

All of these new Notes variants will be based on Version 3.1, they said.

☎Lotus: (617) 577-8500.

LEGENT offers data-transfer tool

BY ADAM GAFFIN

Herndon, Va.

LEGENT Corp. last week said it will begin shipping early next year a new series of tools for transferring data from legacy mainframe databases to local-area network servers.

The company said it will release 16 applications under its Legacy Data (LD) Mover/XP line, grouped into four main product families.

LD-Extract programs will access and extract data from mainframe systems, based on criteria set by the user. LD-Conversion applications take the data and use the mainframe to convert it into the form needed by the target LAN-based server. LD-Transport and LD-Apply are tools for high-speed data transfer from the mainframe to the server.

The products all work with LD-Administrator, a workstation-based graphical user interface for managing the flow of data.

LD-Extract will support IBM DB2 — both SQL and non-SQL — and VSAM formats, LEGENT said, while LD-Conversion will support the mainframe, OS/2 and RISC System/6000 versions of IBM's DB2 databases, plus Oracle, FoxPro and dBase formats.

LD-Transport will work with MVS, OS/2, AIX, Solaris and Windows. LD-Apply will support DB2/2, DB2/6000 and Oracle Corp.'s Fast Loader.

By the third quarter of next year, the company said it expects to add support for IMS and Adabas formats to its Extract programs. The LD-Conversion programs should gain support for Sybase, Inc. databases by the third quarter, as well.

The new product line is part of LEGENT's recently announced Cross Platform Environment, a client/server blueprint for replacing legacy systems with LAN-based relational database management systems.

Rich Rist, products manager for the company's Database Management Unit, said prices depend on the size and complexity of the installation, ranging from $10,000 for a version used to develop and test a full-scale database transfer, to $200,000 for a system that can handle a full-scale transfer at a large site.

☎LEGENT: (703) 708-3000.

DEC

Continued from page 1

Users laid out concerns over whether Polycenter NetView would provide the same level of DECnet management as Polycenter Framework and other DEC management products, and whether investments in training and maintenance contracts would be protected. They also said the new product had better be reasonably priced, even suggesting they should receive it free of charge.

Their concerns stem from the arrangement DEC and IBM announced last summer whereby DEC will license IBM's NetView/6000, port it to its Alpha hardware, rename it Polycenter NetView and make it the company's strategic management platform for the future. DEC's homegrown Polycenter Framework, meanwhile, will essentially be put out to pasture — supported for legacy VAX and Ultrix environments but not significantly enhanced or upgraded (*NW*, Aug. 30, page 1).

The move was not well received on all fronts.

"You're not supporting DECnet, you're just doing SNMP [management]," Mitre technical staff member Sandra Wallace told DEC officials. Wallace was referring to Polycenter NetView demonstrations on the DECUS show floor.

"We want the same type of alarming and reporting we get with DECmcc," added Danny Schaeffer, systems programmer at the Texas Department of Information Resources in Austin. DECmcc is the former name of Polycenter Framework.

Users said they were also looking for tighter integration of Ethernet local-area network, terminal server and LAN bridge management applications with Polycenter NetView. That was promised with Polycenter Framework but never delivered, according to some users.

"DECmcc never made it where DECmcc was supposed to be," Mitre's Wallace said. "I still see [DEC] in a catch-up mode. [They're] still behind."

Users also want distributed management capabilities, including the ability to replicate DECnet configuration databases on different Polycenter NetView consoles. And they'd like to see automatic node discovery and network topology representation through integration with DECdns distributed naming services and X.500 Global Directory Services.

Easy, afforable upgrades to and training on Polycenter NetView was another demand. Some users would like DEC to honor existing Polycenter Framework maintenance contracts if they migrate to the new management platform.

Dow is seeking a trade-in policy that doesn't leave its network vulnerable.

"Dow has 13 DECmcc systems globally," said Michael Rehberg, senior network specialist at Dow. "We would really like to have a trade-in for a Polycenter NetView license, but before I give back a DECmcc license, certain applications have to be ported. [Until then], I need the flexibility to run both."

Other users would like assistance, financial and otherwise, in upgrading hardware to run Polycenter NetView. They would also like interoperability with other management platforms, such as Hewlett-Packard Co.'s OpenView, and increased ease of use.

"A lot of what they requested are things we're looking at," said Sally Jeglinski, DEC's Polycenter NetView product manager.

The only commitments DEC made at last week's meeting was to provide information on Polycenter NetView pricing and training by January. DEC officials also plan to ship Polycenter NetView on OSF/1 next spring.

A version of DEC's Terminal Server Manager application for Polycenter NetView will debut "shortly thereafter," they said.

DEC did not disclose any release dates for a Windows NT version of Polycenter NetView running on Alpha and Intel Corp. hardware.

Comments

To comment on this or any article, drop us a fax at (508) 820-3467, call (800) 622-1108, Ext. 487, or message us via Internet at network@world.std.com.

STORAGE MANAGEMENT

Legato readies LAN-based data storage offerings

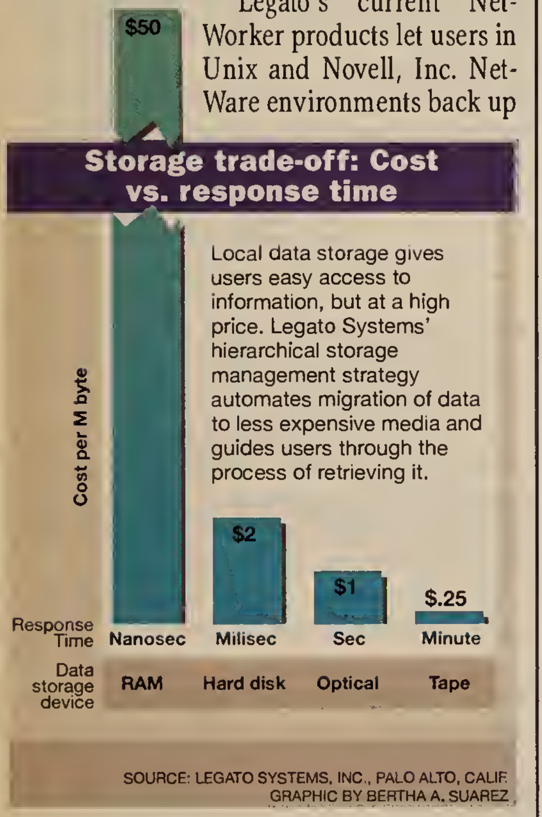
BY CHRISTINE BURNS

Palo Alto, Calif.

Legato Systems, Inc. last week outlined plans to deliver LAN-based data management products that will automate data archiving and migration, and aid in hierarchical storage management (HSM) and disaster recovery.

The products, which will be rolled out within 12 to 18 months, will relieve the administrative headaches of manually controlling stored data and give end users quick and easy access to archived information.

Legato's current NetWorker products let users in Unix and Novell, Inc. NetWare environments back up data from local-area network-based personal computers, workstations and servers to a single backup server. Data on the storage server is stored on hard disk, tape or optical tape. Only network administrators have direct access to archived data, and they must manually locate and retrieve it for end users.



Storage trade-off: Cost vs. response time

Local data storage gives users easy access to information, but at a high price. Legato Systems' hierarchical storage management strategy automates migration of data to less expensive media and guides users through the process of retrieving it.

SOURCE: LEGATO SYSTEMS, INC., PALO ALTO, CALIF.
GRAPHIC BY BERTHA A. SUAREZ

The new HSM and archiving software will run on top of the server software to automate the backup and recovery process for both network administrators and end users.

MIGRATING FILES

Legato's HMS utility will automatically migrate inactive files from client hard disks to the backup server and will migrate the data from the server's hard disk to less expensive storage media according to policies set by the systems administrator.

When a file is migrated, it still appears to the user to be residing on the client's hard disk. When a user clicks on the file, it is automatically delivered from the server library to the client system.

"It's the client software that knows how to navigate through the different storage indices, which means end users have direct access to stored data and don't have to run to a network administrator to get hold of an old file," Legato President Louis Cole said.

"Legato is expanding the definition of [HSM] on a LAN," said Kate Pugh Lienbach, a senior consultant at the Boston-based firm Aberdeen Group, Inc.

The archive utility gives network administrators additional tools to aid in the process of accessing archive data that has been moved to remote disaster recovery sites.

MARK YOUR CALENDARS

The first of new products to be delivered during the third quarter of 1994 will be an archive server for Unix and archive clients for Unix and NetWare 2.X and 3.X clients.

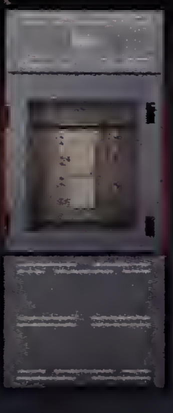
In the fourth quarter of 1994, the company will deliver HSM servers for Unix and NetWare 4.X and an HSM client for all network machines. In addition, an archive server for NetWare will be delivered during the first quarter of 1995.

Users agree that data management strategies must be changed to accommodate growing amounts of company data.

"We can't just keep buying more disks to store data. It's too costly, and we'd be buried alive in stored data," said a network administrator at a Houston-based firm that uses NetWorker for Unix to back up 125 Sun Microsystem, Inc. SPARCstations.

"I'll jump right on the Legato products if they deliver on the promises," said Michael Kaunitz, network administrator for St. Paul Reinsurance Management Corp. in New York. The company uses NetWorker to back up two NetWare servers to 4mm tape that are stored off-site. "Automation like that means I won't have to be the disk police anymore," Kaunitz said.

©Legato: (415) 812-6001.



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Circle Reader Service #17

Ameritech aims to launch long-distance service

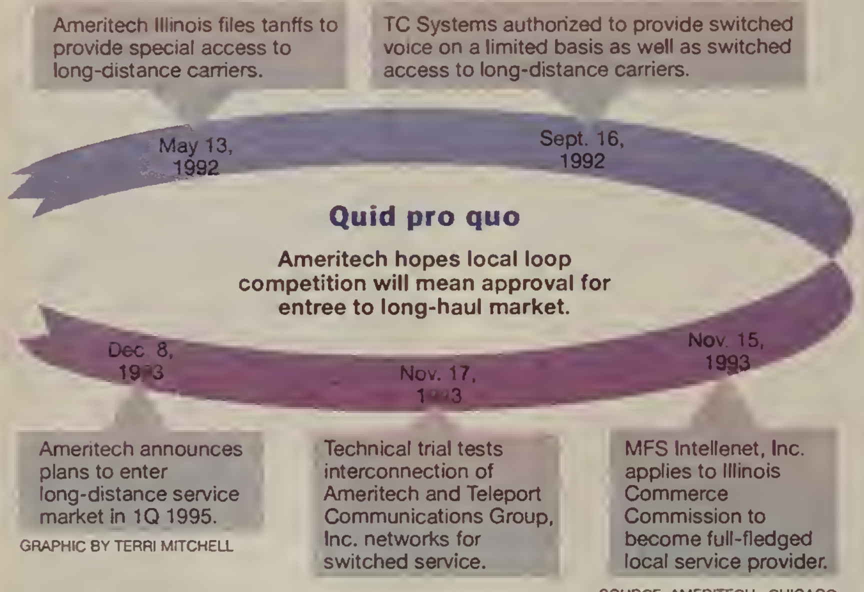
BY BILL BURCH

Washington, D.C.

Ameritech last week announced plans to offer long-distance service in Illinois in early 1995, setting the stage for a definitive resolution to the debate over whether the regional Bell holding companies should be allowed to offer long-haul services.

Claiming effective local competition is on the horizon in the state, Ameritech Vice Chairman Richard Brown said it is time to cap the seemingly endless legal wrangling and Capitol Hill lobbying over the issue.

"There's been speculation and conjecture: what if, maybe, shadows on the stairwell," Brown said. "Our trial in Illinois will put to rest all that kind of concern and serve as a laboratory for full change."


Ameritech Illinois files tariffs to provide special access to long-distance carriers.
TC Systems authorized to provide switched voice on a limited basis as well as switched access to long-distance carriers.
May 13, 1992
Sept. 16, 1992
Quid pro quo
Ameritech hopes local loop competition will mean approval for entree to long-haul market.
Dec. 8, 1993
Nov. 17, 1993
Nov. 15, 1993
Ameritech announces plans to enter long-distance service market in 1Q 1995.
Technical trial tests interconnection of Ameritech and Teleport Communications Group, Inc. networks for switched service.
MFS Intellenet, Inc. applies to Illinois Commerce Commission to become full-fledged local service provider.

GRAPHIC BY TERRI MITCHELL

SOURCE: AMERITECH , CHICAGO

Industry observers gave the plan little chance for approval, saying local loop competition has not developed enough to appease regulators.

For the trial, the carrier wants to provide long-distance service within Illinois and resell capacity for outbound calls beyond the state.

To provide the service, Ameritech will have to get the approval of U.S. District Court Judge Harold Greene, who oversees the Consent Decree. Ameritech plans to ask the Department of Justice to evaluate its proposal, then forward its evaluation to Greene.

Ameritech has proposed that Justice monitor the trial with the understanding that it can revoke Ameritech's waiver for the service if it finds the carrier guilty of anticompetitive practices. The carrier is also seeking approval for the plan from the Federal Communications Commission and the Illinois Commmerce Commission.

Brian Moir, Washington counsel for the International Communications Association, said the Justice Department would have to reverse itself to find in Ameritech's favor. During the triennial review of the Consent Decree in 1991, Justice was firmly against long distance for the RBHCs on the grounds that real competition in local phone service did not yet exist.

"You don't need to go to the Congressional Record [to find out] what percentage of Americans have the ability to make local phone calls," with alternative carriers, Moir said. "When you get much beyond zero, let me know."

The Justice Department also has a record of turning down requests to allow extended service areas that cross local access and transport area boundaries, according to Brad Ramsay, the deputy assistant general counsel for the National Association of Regulatory Utility Commissioners.

If the Justice Department does grace Ameritech with a favorable ruling, the carrier could expect Greene to turn down its request but hope to win a favorable decision from the appeals court. The appeals court was the RBHC's savior when it forced Greene to overturn the Consent Decree's information services ban in 1991.

For its part, Ameritech maintains that it has led the Bells in providing interconnection for alternate service providers, which have made substantial progress in providing local service in the states (see graphic, this page).

Despite such efforts, its potential rivals do not believe Ameritech should yet be allowed into long distance. AT&T praised Ameritech's moves toward local loop competition as a good first step, but said more effective competition should be allowed to develop before Ameritech is let into the long-distance market.

Others likewise see a potential downside. "They have a complete list of customers, they have a complete knowledge of virtually anything that goes on with a customer, and they have total recognition," said Robert Self, a long-distance services analyst with Market Dynamics in New York. With that sort of account control, Ameritech would have an unfair advantage in the long-distance market, he said.

If Ameritech does get permission to provide long-distance service, it would probably choose to buy up smaller carriers to provide it with a national network, Self said, which in turn could lead to less innovation and less competition in the long-distance industry. ☒

Microsoft offers SQL Server tools

BY PETER LISKER

Chicago

Microsoft Corp. last week continued its push into the database arena, announcing new platform support for its Microsoft SQL Server for NT product plus connectivity and migration tools aimed at helping users make the move to NT-based database servers.

At the DB World conference here, Microsoft said SQL Server for NT will now run on Digital Equipment Corp. Alpha AXP and MIPS Computer Systems, Inc. R4X00 Reduced Instruction Set Computing (RISC)-based platforms running Windows NT. The company also delivered SQL Bridge for connecting Windows, DOS and OS/2 clients to Unix-based Sybase, Inc. databases, and the Database Transfer Utility (DTU), software designed to ease the trauma of migrating databases running on Unix or Novell, Inc. NetWare platforms to Windows NT-based servers.

SQL Server, Microsoft's high-end database product, is the first major parallel processing relational database management system to be available across the full range of hardware platforms supported by NT.

The company's new SQL Bridge for NT and DTU products are designed to improve SQL Server's interoperability capabilities.

SQL Bridge is a protocol gateway that lets DOS, Windows and OS/2 clients communicate with Unix-based Sybase databases across dissimilar networks. The product runs on an NT or NT Advanced Server machine and supports Transmission Control Protocol/Internet Protocol and Novell, Inc. Internetwork Package Exchange (IPX) transport protocols plus NetWare, Microsoft LAN Manager and Banyan Systems, Inc. VINES network operating systems.

It will be available in January for $24.95 per server.

"I think that the ability of SQL Bridge to tie desktop PC's into Unix will be very significant for our customers deploying client/server who want to minimize the expense of the connection," said Gary Voth, group product manager for Microsoft's SQL Server group.

Microsoft's new DTU facility provides a simple process for transferring databases to Windows NT from other SQL Server platforms, including Unix, OS/2 and NetWare. Source servers can be Sybase or Microsoft SQL Server.

In addition, DTU can be used to migrate databases back and forth between Intel Corp. and RISC-based SQL Servers. Prior to the introduction of DTU, structural differences in binary formats between the two

See **Microsoft**, *page 66*

Da Vinci, Novell to develop new E-mail package

BY CARYN GILLOOLY

San Jose, Calif.

Under an agreement expected to be announced this week, Novell, Inc. resellers will offer Da Vinci Systems Corp.'s electronic mail package and Da Vinci will develop a NetWare Loadable Module (NLM) version of its E-mail front-end software.

The repackaging agreement will offer users one-stop shopping because a single reseller will be able to offer NetWare and the Novell Message Handling Service (MHS) transport as well as the Da Vinci 2.5 eMail package, although the product and pricing will all be the same as it is today.

But a Da Vinci eMail NLM will further integrate NetWare and Da Vinci eMail by letting the package take advantage of the server-based features of NetWare, such as security, said Don Rainey, executive vice president at Da Vinci, based in Raleigh, N.C.

Da Vinci 2.5 eMail is an E-mail front-end that works with Novell's MHS back-end E-mail engine.

With the NLM version, part of the Da Vinci package would run on the server, which would reduce the size and complexity of the client software, Rainey said. That, in turn, would make it easier to develop versions of the Da Vinci product for multiple types of clients.

See **Da Vinci**, *page 25*

SynOptics, Intel duo to team up to develop fast Ethernet offerings

BY SKIP MACASKILL

Hillsboro, Ore.

Intel Corp. and SynOptics Communication, Inc. this week will announce a joint development and marketing agreement that covers an array of 100M bit/sec Ethernet network interface cards (NIC) and switching hubs.

The companies will jointly develop the NICs using SynOptics' high-speed Ethernet technology and comarket a line of Ethernet switching hubs that the hub maker unveiled this summer.

The joint offerings will be based on the 100M bit/sec Ethernet standard, dubbed 100Base-T, currently pending before the IEEE 802.3 committee that retains Ethernet's carrier-sense multiple access with collision detection access scheme.

Work on a competing 100M bit/sec Ethernet standard backed by Hewlett-Packard Co. is under way in the IEEE 802.12 committee, but that proposal disposes of CSMA/CD and includes frame formats for token-ring as well as Ethernet environments.

"The driving forces behind fast Ethernet include a new generation of client/server applications that require large chunks of bandwidth," said Mike Maerz, general manager of Intel's networking division. "Emerging multimedia applications are also right around the corner. Ethernet users will need to migrate from 10M to 100M bit/sec as their application requirements change."

Under the terms of the deal, SynOptics will provide Intel with its Fast Frame technology, which Intel will use to build a line of NICs for a variety of workstations and personal computers that can be software-configured to run at either 10M or 100M bit/sec.

In initial release, slated for the second quarter of 1994, the NICs will support Extended Industry Standard Architecture (EISA)- and Peripheral Component Interconnect-based machines, with support for other bus types such as ISA following in future releases.

"The idea is to create an Ethernet product line that works like existing token-ring adapters and hubs, which can be configured to run at 4M or 16M bit/sec," said Bob Trexler, product line manager at Intel. "By providing one controller that handles both 10M and 100M bit/sec speeds, we can offer products that scale 10 times in performance but cost only two times as much as offerings that only provide 10M bit/sec."

SynOptics will incorporate the Fast Frame technology into a line of stand-alone Ethernet switches and modules for its intelligent hubs. It is based on five custom application-specific integrated circuits devel-

See **Duo**, *page 25*

NETWORK WORLD

The Newsweekly of Enterprise Network Strategies

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1 Industry: (check one only)

01. ☐ Manufacturers (other than Computer/Communications)
02. ☐ Finance/Banking
03. ☐ Insurance
04. ☐ Real Estate
05. ☐ Healthcare Services
06. ☐ Legal
07. ☐ Hospitality
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09. ☐ Transportation
10. ☐ Utilities
11. ☐ Education
12. ☐ Process Industries (Mining/Construction/ Petroleum Refining/Agriculture/Forestry)
13. ☐ Government, State/Local
14. ☐ Government, Federal
15. ☐ Military
16. ☐ Aerospace
17. ☐ Consultants (Independent)
18. ☐ Carriers
19. ☐ Interconnects
20. ☐ Manufacturers (Computer/Communications)
21. ☐ VAR/VAD/VAN/ Systems Houses
22. ☐ Distributors, Computer Related
23. ☐ Distributors, Communications Related
24. ☐ Other____________________________

2 What is your job function? (check one only)

NETWORKING MANAGEMENT

1. ☐ Networking Mgmt. 3. ☐ Datacom/Telecom Mgmt.
2. ☐ LAN Mgmt. 4. ☐ Engineering Mgmt.

MIS MANAGEMENT

5. ☐ MIS, IS, IT Mgmt. 6. ☐ Engineering Mgmt.

CORPORATE MANAGEMENT

7. ☐ Corporate Mgmt. (CIO, CEO, Pres., VP, Dir., Mgr., Financial Mgmt.)

8. ☐ Consultant (Independent)

9. ☐ Other____________________________

3 My responsibilities include: (check one only)

1. ☐ LANs/ Internetworking/ WANs 3. ☐ LANs 5. ☐ None
2. ☐ LANs/ Internetworking 4. ☐ WANs

4 What is the total number of sites for which you have purchase influence? (check one only)

1. ☐ 100+ 3. ☐ 20 - 49 5. ☐ 2 - 9. 7. ☐ None
2. ☐ 50 - 99 4. ☐ 10 - 19 6. ☐ 1

5 What is your scope and involvement in purchasing decisions for network products & services for your enterprise?

A. Scope (check one only)

1. ☐ Corporatewide
2. ☐ Multienterprise (consultants)
3. ☐ Departmental

B. Involvement (check all that apply)

1. ☐ Recommend/Specify
2. ☐ Approve
3. ☐ Evaluate

4. ☐ None (A or B)

6 Check all that apply in Columns A and B:

A. I am involved in the purchase of the following products/services.

B: I plan to purchase the following products/services in the next year.

Involved A / Plan to Purchase B

LOCAL-AREA NETWORKS

☐ 01. ☐ Local-Area Networks
☐ 02. ☐ LAN Servers
☐ 03. ☐ LAN Operating Systems Software
☐ 04. ☐ Superservers
☐ 05. ☐ Data Base Servers (Oracle, Sybase, etc).
☐ 06. ☐ Terminal Servers
☐ 07. ☐ LAN Services
☐ 08. ☐ LAN Storage Devices (optical, tape, disk, etc,. including backup systems)
☐ 09. ☐ Network Test Equipment
☐ 10. ☐ Hubs
☐ 11. ☐ Cables, Connectors, Baluns
☐ 12. ☐ UPS
☐ 13. ☐ Network Adapter Boards
☐ 14. ☐ Peer-to-Peer LANs
☐ 15. ☐ Wireless LANs
☐ 16. ☐ SNMP Network Management
☐ 17. ☐ ATM (Asynchronous Transfer Mode)

A B **INTERNETWORKING**

☐ 18. ☐ Bridges
☐ 19. ☐ Routers
☐ 20. ☐ Gateways
☐ 21. ☐ Bridge/Routers
☐ 22. ☐ Hubs
☐ 23. ☐ Intelligent Hubs
☐ 24. ☐ Communications Servers

Involved A / Plan to Purchase B

A B **COMPUTERS/PERIPHERALS**

☐ 25. ☐ Micros/PCs
☐ 26. ☐ Minis
☐ 27. ☐ Mainframes
☐ 28. ☐ Pen-Based
☐ 29. ☐ Laptops
☐ 30. ☐ Workstations
☐ 31. ☐ Image Processing Workstations
☐ 32. ☐ Front-End Processors
☐ 33. ☐ Terminals
☐ 34. ☐ Printers
☐ 35. ☐ Cluster Controllers
☐ 36. ☐ Fax Machines
☐ 37. ☐ X-Terminals

A B **SOFTWARE/APPLICATIONS**

☐ 38. ☐ Network Management
☐ 39. ☐ Micro to Mainframe
☐ 40. ☐ Security
☐ 41. ☐ Communication/Terminal Emulation
☐ 42. ☐ Word Processing
☐ 43. ☐ Operating Systems
☐ 44. ☐ Business Applications (Finance/Mfg/HR)
☐ 45. ☐ Applications Development
☐ 46. ☐ Data Base Management
☐ 47. ☐ Spreadsheet
☐ 48. ☐ Groupware
☐ 49. ☐ EDI
☐ 50. ☐ E-Mail
☐ 51. ☐ Windows/Graphical User Interface
☐ 52. ☐ 4GL/Development
☐ 53. ☐ Multimedia
☐ 54. ☐ Graphics
☐ 55. ☐ Utilities

A B **WIDE-AREA NETWORK EQUIPMENT/SERVICES**

☐ 56. ☐ Modems (9.6K bps and over)
☐ 57. ☐ Modems (under 9.6K bps)
☐ 58. ☐ T-1
☐ 59. ☐ T-3
☐ 60. ☐ Fractional T-1
☐ 61. ☐ Data Switches
☐ 62. ☐ SMDS
☐ 63. ☐ ATM (Asynchronous Transfer Mode)
☐ 64. ☐ Matrix Switches
☐ 65. ☐ Packet Switches
☐ 66. ☐ Protocol Converters
☐ 67. ☐ Diagnostic/Test Equipment
☐ 68. ☐ DSU/CSUs
☐ 69. ☐ Microwave
☐ 70. ☐ Fax Boards/Modems
☐ 71. ☐ VSAT
☐ 72. ☐ Fiber Optic
☐ 73. ☐ Satellite
☐ 74. ☐ ISDN
☐ 75. ☐ PBXs (over 1000 lines)
☐ 76. ☐ PBXs (under 1000 lines)
☐ 77. ☐ Automatic Call Distributors
☐ 78. ☐ Voice Messaging Systems
☐ 79. ☐ Videoconferencing Systems
☐ 80. ☐ Voice Response/Processing
☐ 81. ☐ Switched Voice
☐ 82. ☐ Dedicated Leased Line
☐ 83. ☐ Switched Data
☐ 84. ☐ Centrex
☐ 85. ☐ E-Mail/On-Line Information
☐ 86. ☐ Image Processing
☐ 87. ☐ Audio Teleconferencing
☐ 88. ☐ Local Services
☐ 89. ☐ WATS MTs
☐ 90. ☐ International
☐ 91. ☐ Virtual Networks
☐ 92. ☐ Frame Relay
☐ 93. ☐ Value Added Services
☐ XX ☐ None of the above (1-93)

7 What is the total number of A: LANs B: Workstations/Nodes in your entire organization?

	LANs A		Workstations/ Nodes B
1.	☐	5,000+	☐
2.	☐	1,000 - 4,999	☐
3.	☐	100 - 999	☐
4.	☐	50 - 99	☐
5.	☐	10 - 49	☐
6.	☐	9 or Less	☐

8 Which of the following network platforms are currently installed/planned in the next year?

NETWORK ARCHITECTURES

Present Planned

☐ 01. ☐ SNA
☐ 02. ☐ DECNET
☐ 03. ☐ MAP/TOP
☐ 04. ☐ TCP/IP
☐ 05. ☐ DCA (Unisys)
☐ 06. ☐ X.25

Present Planned

☐ 07. ☐ NOVELL IPX/SPX
☐ 08. ☐ APPC/APPN/LU 6.2
☐ 09. ☐ NETBIOS
☐ 10. ☐ OSI
☐ 11. ☐ APPLETALK
☐ 12. ☐ OTHER____________________

LAN OPERATING SYSTEM

☐ 13. ☐ LOCALTALK (APPLETALK)
☐ 14. ☐ BANYAN (VINES)
☐ 15. ☐ DCA (IRMALAN)
☐ 16. ☐ DCA (10-NET)
☐ 17. ☐ IBM (LAN SERVER)
☐ 18. ☐ IBM (PC LAN PROGRAM)
☐ 19. ☐ MICROSOFT (LAN MANAGER)
☐ 20. ☐ UNGERMANN-BASS (NET/1)
☐ 21. ☐ NOVELL (NETWARE, 2.X, 3.X, 4.X)
☐ 22. ☐ PROTEON (PRONET)
☐ 23. ☐ SITKA (TOPS)
☐ 24. ☐ 3COM (3+, 3+OPEN)
☐ 25. ☐ ARTISOFT (LANTASTIC)
☐ 26. ☐ HAYES (LANSTEP)
☐ 27. ☐ DEC (PATHWORKS)
☐ 28. ☐ OTHER____________________

LAN ENVIRONMENT

☐ 29. ☐ 4M TOKEN RING
☐ 30. ☐ 16M TOKEN RING
☐ 31. ☐ ARCNET
☐ 32. ☐ ETHERNET
☐ 33. ☐ STARLAN
☐ 34. ☐ FDDI
☐ 35. ☐ LOCALTALK
☐ 36. ☐ 10BASE-T
☐ 37. ☐ OTHER____________________

OPERATING SYSTEM

☐ 38. ☐ DOS
☐ 39. ☐ UNIX/XENIX/AIX
☐ 40. ☐ OS/2
☐ 41. ☐ OS/2 2.X
☐ 42. ☐ MVS
☐ 43. ☐ VM
☐ 44. ☐ VMS
☐ 45. ☐ MACINTOSH
☐ 46. ☐ WINDOWS
N/A 47. ☐ WINDOWS NT
☐ 48. ☐ X WINDOWS
☐ 49. ☐ OTHER____________________

9 For which areas outside of the U.S. do you have purchase influence? (check all that apply)

1. ☐ Europe 4. ☐ Australia
2. ☐ Asia 5. ☐ Middle East
3. ☐ South America 6. ☐ None

10 Which of the following hardware platforms is installed/planned in your company? (check all that apply)

	Mainframes Currently Installed	Planned Next Year	Minis Currently Installed	Planned Next Year
01. DEC	☐	☐	☐	☐
02. IBM	☐	☐	☐	☐
03. AMDAHL	☐	☐	☐	☐
04. AT&T	☐	☐	☐	☐
05. BULL HNIS	☐	☐	☐	☐
06. DATA GENERAL	☐	☐	☐	☐
07. HP	☐	☐	☐	☐
08. TANDEM	☐	☐	☐	☐
09. UNISYS	☐	☐	☐	☐
10. OTHER__________	☐	☐	☐	☐

MICROCOMPUTERS
(fill in the numbers)

	NUMBER INSTALLED	NUMBER PLANNED NEXT YEAR
11. MACINTOSH 20, 30, 40		
12. MACINTOSH OTHER		
13. PCs BASED ON 80586	N/A	
14. PCs BASED ON 80486		
15. PCs BASED ON 80386		
16. PCs BASED ON 80286		
17. PCs BASED ON 8086/8088		
18. RISC / UNIX BASED WKSTNS		
19. OTHER		

11 Estimated value of networking equipment and services:

A. Which you helped specify, recommended or approved in the last year?

B. Which you plan to help specify, recommend or approve in the next year?

A B

☐ 1. ☐ $100 million and over
☐ 2. ☐ $50 - $99.9 million
☐ 3. ☐ $25 - $49.9 million
☐ 4. ☐ $20 - $24.9 million
☐ 5. ☐ $10 - $19.9 million
☐ 6. ☐ $5 - $9.9 million
☐ 7. ☐ $1 - $4.9 million
☐ 8. ☐ $500,000 - $999,999
☐ 9. ☐ $499,999 or less

12 Estimated gross annual revenue of your entire company/institution: (check one only)

1. ☐ Over $10 billion 5. ☐ $50 to $99.9 million
2. ☐ $1 to $9.9 billion 6. ☐ $10 to $49.9 million
3. ☐ $500 to $999.9 million 7. ☐ $5 to $9.9 million
4. ☐ $100 to $499.9 million 8. ☐ $4.9 million or less

13 Estimated number of employees for your entire corporation:

1. ☐ Over 10,000 4. ☐ 1,000 - 2,499
2. ☐ 5,000 - 9,999 5. ☐ 500 - 999
3. ☐ 2,500 - 4,999 6. ☐ 499 or less

9226

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BRIEFS

Proteon, Inc. last week announced that it has appointed Bruce Bergman its new chief executive officer to succeed Patrick Courtin, who resigned in July. Bergman has spent the past 10 years as president and CEO of Xylogics, Inc., a Burlington, Mass.-based supplier of remote access hardware and software products.

General DataComm Industries, Inc. (GDC) last week announced that it has acquired Netcomm, Ltd., a Basildon, England-based manufacturer of Asynchronous Transfer Mode (ATM) customer premises equipment. Netcomm will become a wholly owned subsidiary of General DataComm and will serve as its advanced research and development arm for ATM and other fast packet switching technologies. GDC acquired NetComm in exchange for cash and common stock.

Fujitsu Networks Industry, Inc. last week announced a Windows-based interactive Help-Desk application that will help users ask questions and solve problems in real time across a local- or wide-area network.

The DeskTop Conferencing for Support (DTC-Support) is designed to enable HelpDesk operators to provide support and training from their desks, train employees at several locations in a single session and lower costs by reducing travel. The application is divided into Expert and Client parts, with the Client running on end-user workstations and the Expert running on consoles used by help desk staff and MIS managers.

DTC-Support is available now and costs $99 per user for a single Client version. Expert versions cost $299 for a single user, $2,490 for a 10-user pack and $17,900 for a 100-user pack.

Fujitsu Networks: (203) 326-2700.

Forvus Research, Inc. has rolled out TN3270 software for its line of 3270 emulation packages, Forvus for Windows and Forvus for DOS.

The software allows personal computers on Transmission Control Protocol/Internet Protocol LANs to access data on IBM hosts via 3270 emulation. It works with TCP/IP protocol stacks from FTP Software, Inc., Novell, Inc. and Microsoft Corp.

TN3270 support is included in Forvus for Windows and Forvus for DOS at no extra charge. Those packages cost $300 each, and a version with TN3270 support will ship in January.

Forvus: (800) 323-4887.

LEGENT Corp. recently signed a letter of intent to purchase TeamOne Systems, Inc. a developer of Unix-based configuration management software. Under terms of the purchase, TeamOne shareholders will receive approximately 410,000 shares of LEGENT common stock.

Following completion of the acquisition, LEGENT executives said TeamOne's technology will be incorporated into LEGENT's Endevor change management product line.

LEGENT: (703) 708-3000.

Users who want only the electronic mail facil-

See Briefs, *page 13*

Internetworking vendors have mixed views on benefits of channel interfaces

Some claim it will improve performance and save users money.

BY MAUREEN MOLLOY

A battle is brewing in the internetwork arena over whether the integration of SNA nets with LAN internetworks should extend to the mainframe channel.

As part of their Systems Network Architecture integration strategies, some leading router and hub vendors are shipping or developing mainframe channel interfaces for their wares. The vendors say channel-attaching hubs and routers to mainframes will improve performance and, in some cases, save users money by obviating the need for devices such as the IBM 3174 cluster controller and 3172 Interconnect Controller, which is used to attach local-area networks to mainframe channels.

But detractors claim channel interfaces make little sense when weighed against the development headaches vendors must endure in order to provide the capability and reliability issues presented when multiple functions are combined in a single device.

PROPONENTS

Router kingpin Cisco Systems, Inc. is hard at work developing support for channel-attachment of its high-end 7000 Internetwork Router to an IBM mainframe, while Network Systems Corp. (NSC) already supports that function on its high-end 6800 router.

Cisco is developing two channel interfaces for its 7000, including an IBM Enterprise System Connection (ESCON) card that will enable the router to directly connect to an IBM host at speeds of at least 10M byte/sec.

ESCON is IBM's high-speed fiber-optic mainframe channel architecture. Cisco will also introduce an interface that supports IBM's older but more ubiquitous 4M byte/sec bus and tag channels (*NW*, June 14, page 1).

NSC already supports bus and tag interfaces and said it will support an ESCON interface by mid-1994.

Even some hub vendors are joining the fray. Cabletron Systems, Inc. is expected to roll out next quarter its first channel-attach products that will include a host interface for its high-end hub. When used with Cabletron's recently announced 3174 module, it will obviate the need for a separate 3174 cluster controller, saving money and conserving limited floor space, according to Tom Burkhardt, Cabletron's director of IBM connectivity.

"We intend to run things like NetWare for SAA as a server right out of the hub and channel-attach it to a mainframe," Burkhardt said. "We'll also support downsteam physical units through the channel so that PU 2 and PU 2.1 devices can communicate with the mainframe through the same channel-attached interface."

Analysts said the advent of channel interfaces on routers and hubs is a promising development.

"The demand for bandwidth is insatiable, and that's true whether you're talking about a PC, a workstation or a mainframe," said John Pickens, technical consultant at the Mayfield Fund, a venture capital firm based in Menlo Park, Calif.

"You don't get as much bandwidth through traditonal [front-end processors], so any internetworking device that can achieve higher bandwidth access into and out of the

See Benefits, *page 15*

The channel challenge

The pros and cons of channel-attaching routers and hubs to IBM mainframes.

Pros:

- Tightens integration of SNA and LAN internetworks.
- Simplifies network design.
- Boosts performance.
- Lessens dependency on expensive IBM 3745 front-end processors.

Cons:

- Limited downstream physical unit support.
- Development is time- and resource-intensive.
- Potentially less reliable than IBM 3745 or 3172.
- Potentially insufficient memory in router's buffer.

GRAPHIC BY SUSAN J. CHAMPENEY

SNA NETWORKING

Satori's ScriptMate automates PC-to-mainframe communications

BY MICHAEL COONEY

Roswell, Ga.

Satori Automation, Inc. has rolled out a new software tool that lets SNA users automate routine PC-to-mainframe file transfers.

The company's ScriptMate software will let personal computers emulating 3270 terminals automatically execute mundane tasks such as running reports, logging on and off to electronic mail programs, and transferring files.

"PC users interacting with the mainframe have to wait for mainframe prompts, commands and replies, wasting time and effort," said Phil Petree, president of Satori Automation. "With the ScriptMate software, users can run unattended file transfers and automate tasks that would have taken them hours to do in the past."

ScriptMate runs on OS/2, Windows and DOS- based PCs running 3270 emulation programs that let them communicate with Systems Network Architecture mainframes.

Once installed, users define the functions they want performed to a ScriptMate menu and save it in a ScriptMate file stored on the PC. Users can then enter a single command to kick off automated actions, such as logging on and off to a mainframe application, saving mainframe data to a specific PC database or running an E-mail program.

ScriptMate comes with a schedule feature, ScheduleMate, which can be programmed to perform any of the user-defined tasks unattended. For example, ScriptMate will automatically send large file transfers in the middle of the night without user intervention.

ScriptMate supports any industry-standard 3270 emulation package from vendors including Attachmate Corp., Digital Communications Associates, Inc., Novell, Inc. and Wall Data, Inc.

According to Petree, users can run a script written for one vendor's 3270 emulator on one operating system and transfer the script to another vendor's emulator on a completely different operating system without making changes.

"The software is good for enterprise users because it doesn't limit them to one platform — be it OS/2, DOS or Windows. Plus it doesn't limit them to one 3270 emulation or gateway vendor — they can use whatever they want," Petree said.

Petree said ScriptMate competes most closely with automation facilities found in Attachmate's Now for DOS 3270 emulation product, but that program is limited to the DOS world.

Single-user prices start at $295. A five-user version is available for $495.

©Satori Automation: (404) 640-0904.

"The software is good for enterprise users because it doesn't limit them to one platform."

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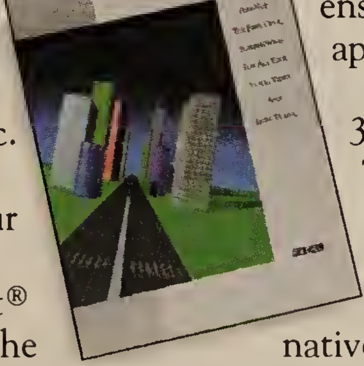

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Circle Reader Service #21

SunConnect to license NetLabs code for new platform

Unveils products to migrate current SunNet Mgr. base.

BY JIM DUFFY

Mountain View, Calif.

SunConnect last week announced it will license technology from NetLabs, Inc. to be used in its next- generation, object-oriented Encompass management platform and unveiled two products to help users migrate to the new system.

SunConnect also said it will delay shipments of SunNet Manager 2.2 until the first quarter of of 1994. Announced last August, Version 2.2. includes support for Simple Network Management Protocol Version 2 and was supposed to ship this past October.

Under the licensing agreement, which was expected, SunConnect has purchased NetLabs' object-oriented DiMONS 3G platform as the core for a next-generation SunNet Manager product, which is code-named Encompass (*NW*, Nov. 15, page 1). Encompass, which SunConnect said will ship in late 1994, is intended to be a fully distributed management system with which users can establish cooperating management domains that share data stored in a common repository.

With Encompass, users will be able to structure their management environment in a peer-to-peer fashion.

With Encompass, users will be able to structure their management environment in a peer-to-peer fashion, in which domain consoles freely interact sharing applications and data, or in a hierarchical manner with a centralized "manager-of-managers." Currently, SunNet Manager is capable only of manager-to-agent communications.

SunConnect and NetLabs said they intend to maintain some commonality between Encompass and NetLabs' DiMONS 3G, including application program interfaces (API), console interoperability protocols and object- oriented data models. The two will diverge, however, on user interfaces and management tools.

The common APIs may open up SunConnect's camp of 100 or so independent software vendors (ISV) to NetLabs, thereby expanding the application portfolio of the DiMONS 3G platform, analysts and NetLabs officials said.

SunConnect also pledged to support existing SunNet Manager APIs in Encompass, thereby fostering backward compatibility with existing SunNet Manager applications and helping those users migrate to the Encompass platform, said Stan Baldwin, SunConnect director of marketing.

To aid in that migration, SunConnect also rolled out two software packages that add peer-type capabilities to the current SunNet Manager product. The packages, Cooperative Consoles and Cooperative Reporting, run on SunNet Manager consoles under the Solaris and SunOS operating systems (*NW*, Dec. 6, page 2).

Cooperative Consoles captures topology, event and trap information from one SunNet Manager console and replicates it to databases used by other consoles. This allows network control to be shared among SunNet Manager operators, which provides backup in case of console failure and aids in off-hour operation.

"The key to this whole thing is to get the ISVs to back it," said Charlie RObbins of the Aberdeen Group.

Cooperative Reporting provides the consoles with a standard SQL interface between separate console databases, letting users collect data from multiple consoles for trend analysis or other network event information. Cooperative Reporting includes formatted reports, report generation tools and a data aggregator for compiling management information. They currently work only with Sybase, Inc. databases, but SunConnect intends to make these products database independent over time, Baldwin said.

Cooperative Consoles and Cooperative Reporting will also work with the new Encompass platform.

Analysts said SunConnect's strategy to buy instead of build an object-oriented distributed management platform gives the company new momentum in the management platform business. Observers were waiting for the company to outline its plan for competing with the IBM/Digital Equipment Corp. union and Hewlett-Packard Co., which recently disclosed its strategy for taking OpenView into the distributed, peer-to-peer realm.

But the NetLabs relationship is only half the battle.

"The key to this whole thing is to get the ISVs to back it," said Charlie Robbins of the Aberdeen Group in Boston.

Added John McConnell, president of McConnell Consulting, Inc., in Boulder, Colo., "They've got a pretty good story about how they're going to do it. But they have to do it. There's still that piece."

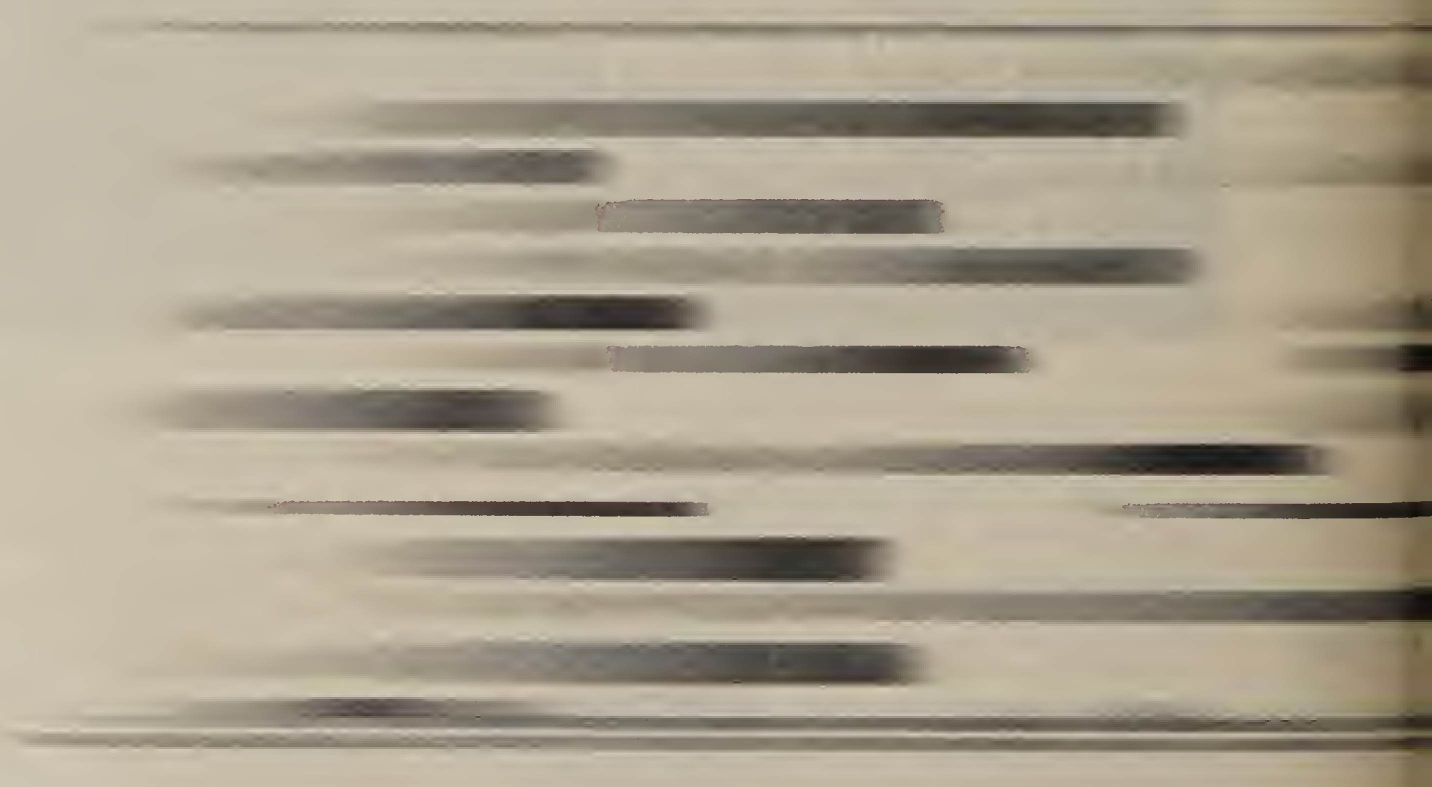
Meanwhile, SunNet Manager 2.2 has been delayed due to more stringent quality testing and debugging, Baldwin said.

When it debuts in the first quarter next year, it will run on Sun's Solaris 2 and SunOS operating systems. A version for Solaris X86 is scheduled to be delivered in the third quarter, although a developer's release will debut this month. The product was originally intended to run only on Solaris 2.

A developer's release of Encompass will be available in the second quarter of 1994, and customer releases will be available in the fourth quarter. Cooperative Consoles and Cooperative Reporting will debut in the first quarter of 1994.

Pricing was not disclosed for any of the new products.

✆SunConnect: (800) 241-2669.



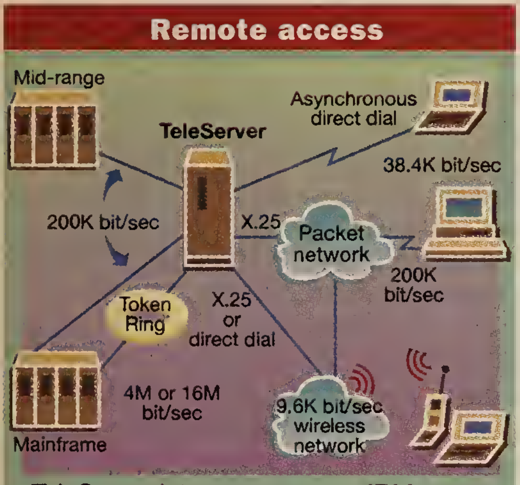
Telepartner intros server for remote access

BY JIM DUFFY

Farmington, Conn.

Telepartner International, a developer of PC-to-IBM host connectivity software, last week unveiled a communications server that provides remote access to IBM mainframes and mid-range systems via wireline and wireless networks.

The company's TeleServer is a DOS-based Intel Corp.80486 33 MHz server that allows Windows, DOS and Macintosh workstation users to access IBM hosts over asynchronous dial-up, X.25 and wireless networks.



TeleServer lets users access IBM applications over dial-up asynchronous, X.25 or wireless networks.

SOURCE: TELEPARTNER INTERNATIONAL, FARMINGTON, CONN.
GRAPHIC BY BERTHA A. SUAREZ

TeleServer attaches to an IBM host via a single Synchronous Data Link Control or 4M or 16M bit/sec Token-Ring adapter card. The SDLC connection supports speeds up to 200K bit/sec, said David Shute, product line director at Telepartner.

For remote access, the server comes standard with a single port X.25 or multiuser asynchronous dial-up card. Additional cards can be added to TeleServer's four expansion slots to increase synchronous port capacity to eight and asynchronous to 32, Shute said.

Asynchronous connections can support speeds of 38.4K bit/sec, and X.25 connections can reach 200K bit/sec, Shute said. Wireless speeds top out at 9.6K bit/sec.

TeleServer can support as many as 64 concurrent users. The server works with Telepartner's line of IBM terminal-emulation software, which runs on the remote workstations. They include Packet/3270 and Packet/3270 LAN, which provide 3270 terminal emulation for Windows, DOS and Macintosh personal computers, and local-area network-attached PCs, respectively.

They also include Packet/5250 for Windows, a 5250 terminal emulator that gives Windows PCs access to IBM Application System/400 minicomputers, and Mobi/3270, a 3270 emulation package that works over RAM Mobile Data's Mobitex wireless network.

TeleServer's protocol software, meanwhile, was developed by Telepartner. It features a "sliding window" transmission scheme whereby packets can be segmented into smaller packets to avoid retransmitting an entire data stream should an error occur.

According to the company, users can set the packet sizes anywhere between 127 bytes and 1K byte.

"It's similar in design to the HDLC protocol, but there's no polling involved," Shute said.

TeleServer is priced from $9,700 to $14,200. Prices for the workstation software begin at $295 per copy.

©Telepartner: (800) 935-3270.

BRIEFS

Contined from page 10

ity of **IBM**'s OfficeVision/400 software for their Application System/400s can now buy JustMail/400. IBM has announced that it separated the E-mail function from OfficeVision/400's calendar, word processing and scheduling functions, and packaged it as JustMail.

JustMail users can exchange mail with OfficeVision/400 users on other AS/400s, IBM said. And JustMail/400 can be upgraded to a full OfficeVision/400 suite as other functions are required. JustMail/400 is scheduled for availability Dec. 17. A five-user version starts at $995. Other users can be added at $49 each, or a 250-user version will be available for $12,250.

IBM: (800) 426-2468.

Boca Research, Inc. has introduced two communications devices designed for computers with PCMCIA slots.

The BEN1PA card will connect computers with a Type II slot to an Ethernet network. It comes with software drivers for a variety of networks and programs, and has a suggested retail price of $229.

The M144PA 14.4K bit/sec modem offers MNP5 and V.42bis data compression and MNP4 and V.42 error correction, as well as facsimile capabilities. It is priced at $369

Boca Research: (407) 997-6227.

Brixton Systems, Inc. has announced that it is joining **Hewlett-Packard Co.'s** Channels Partner Program, a partnership that will make Brixton's BrxPU5 virtual mainframe gateway software available to users of HP's Apollo 9000 Series 700 workstations and 9000 Series 800 Business Servers.

The software works by enabling a Unix machine to emulate an IBM mainframe, which lets IBM terminals access client/server applications running on HP 9000 series computers.

StrataCom, Inc. has signed on two new distributors: Tandem Chile and Intersys Mexico, which will enable the vendor's cell and frame relay switches to be made available in Chile and Mexico, respectively. Both agreements are effective immediately.

IBM software grants access to apps everywhere

BY MICHAEL COONEY

Raleigh, N.C.

Net managers looking to give users access to applications no matter where they reside in an enterprise network may want to test drive IBM's new Network Door/2 (NetDoor).

NetDoor is an OS/2, client/server-based software product that gives client workstations access to a range of applications resident on IBM LAN Server local nets plus IBM minicomputers and mainframes, whether the server is in the next room or across the country.

NetDoor's server component is designed to make any designated OS/2 box a sort of enterprise network restaurant with a large application menu, while the client portion lets any OS/2 client access those applications.

The OS/2 NetDoor server catalogues all applications on the enterprise, including those stored on other LAN Servers, IBM's Application System/400 or on the mainframe.

The NetDoor client calls the server via its local IBM LAN Server, and the user picks an application from the menu presented. NetDoor server retrieves the application and then downloads it to the client's local LAN Server, from where it is distributed to the requesting client and/or other clients on the local net.

The user has the option of accessing the application on their local server or downloading it to their own workstation, IBM said.

"This software lets users ask for particular applications. It's not like NetView Distribution Manager [IBM's software distribution product], where the software code is essentially forced onto the client from the mainframe or the server," according to Mark Pozefsky, IBM's MultiProtocol Transport Networking product and system manager. "With NetDoor, users can pick and choose applications."

The NetDoor server also has the ability to distribute the user load among enterprise LAN servers, minicomputers and mainframes so that when a user logs onto a server that is being heavily used by one work group, it redirects the request to a less busy host.

NetDoor supports Network Basic I/O System and Transmission Control Protocol/Internet Protocol environments. When communicating with an IBM mainframe, the server uses Communication Manager/2 and its Systems Network Architecture LU 6.2 support. Using TCP/IP, it can be used to access TCP/IP applications on the mainframe.

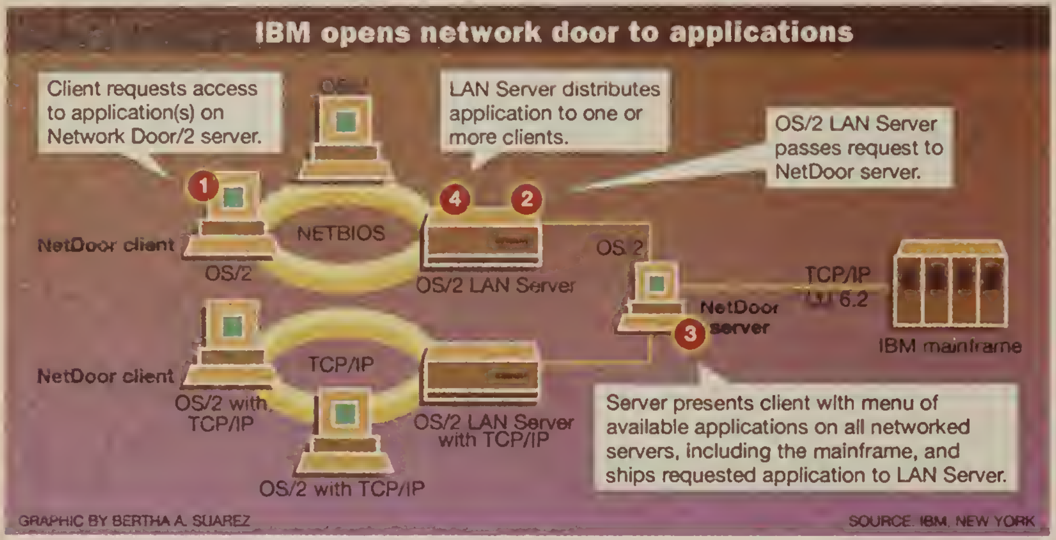
NetDoor also supports access to LAN Servers via IBM's LAN-to-LAN Wide Area Networking program, which lets TCP/IP and NETBIOS traffic flow over SNA nets.

In addition, NetDoor supports IBM's Configuration, Installation and Distribution technology, so that software updates can be sent to it via NetView DM/2 nodes.

The OS/2 version is just the first incarnation of NetDoor, Pozefsky said. Versions that work with servers from vendors such as Novell, Inc. and Banyan Systems, Inc. will be available in the future.

NetDoor is available for $550 for the initial server and $495 for additional servers. Client software costs $75 each.

©IBM: (800) 426-2468


IBM opens network door to applications

① Client requests access to application(s) on Network Door/2 server.

② OS/2 LAN Server passes request to NetDoor server.

③ Server presents client with menu of available applications on all networked servers, including the mainframe, and ships requested application to LAN Server.

④ LAN Server distributes application to one or more clients.

GRAPHIC BY BERTHA A. SUAREZ

SOURCE: IBM, NEW YORK

RAD to unveil frame relay PAD, low-end mux

BY MAUREEN MOLLOY

Mahwah, N.J.

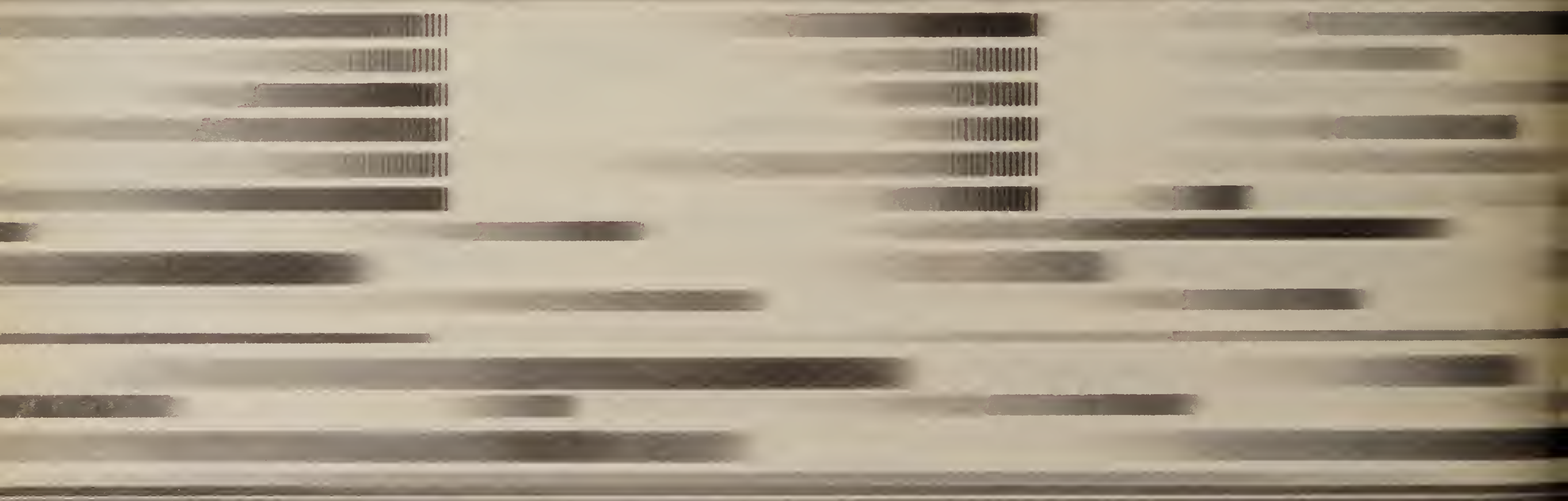
RAD Data Communications, Inc. will unveil three products at ComNet '94 in Washington, D.C. next month, including a miniature frame relay packet assembler/disassembler and a low-end voice/data multiplexer.

The frame relay PAD, dubbed the APD-2, is a two-channel device that serves as a frame relay access unit for asynchronous traffic and X.25 hosts.

The APD-2, which is the size of a hand-held remote control device, supports speeds up to 19.2K bit/sec and has a maximum throughput of 800 packet/sec for 64-byte packets. It is equipped with a management agent that enables users to perform system configuration and compile statistics for status reports from any personal computer or terminal.

The APD-2 is equipped with a management agent that enables users to perform system configuration.

It supports packet sizes of up to 4.096K bytes and complies with all Telecommunication Standardization Sector (formerly CCITT) and ANSI recommendations for frame relay



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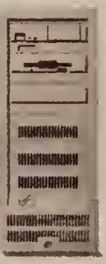
85 Server

95 Server

and X.25.

Available in February, the APD-2 costs $500.

The vendor also announced the SPS-2, another version of the APD-2 that also supports High-Level Data Link Control traffic over a frame relay network. Also available in February, the SPS-2 costs $600.

The third product RAD is scheduled to unveil next month is a multiplexer that integrates one or two voice channels with one synchronous data channel onto a dial-up or leased line at speeds up to 256K bit/sec.

The DV-Mux is an adaptive time-division multiplexer that enables bandwidth to be allocated dynamically between voice and data channels.

Each voice channel employs a proprietary voice compression technique that lets users compress a 64K bit/sec channel to between 6.4K and 9.6K bit/sec. Each channel can be connected to either a stand-alone telephone or private branch exchange extension line.

The primary line supports speeds up to 256K bit/sec, but the actual data subchannel rate will vary depending on whether the two voice subchannels are in use and whether the operating mode is adaptive or nonadaptive.

In adaptive mode, the bandwidth is allocated to the voice and data channels dynamically, with the data channel receiving additional bandwidth when the voice channel is idle.

In the nonadaptive mode, each channel is allocated a fixed amount of bandwidth.

DV-Mux pricing starts at $1,390, and it will be available in February.

©RAD: (201) 529-1100.

Benefits

Continued from page 13

mainframe is going to be attractive to users," he added.

Providing such access doesn't come cheap, however. Joe Mohen, chief technical officer of Uniondale, N.Y.-based Proginet Corp., a software firm that specializes in file-transfer applications for IBM mainframes, said the technical expertise required to implement channel technology is something most router and hub vendors lack.

"To make significant inroads into this area requires a heavy investment. Only those vendors that can afford the development resources and engineering expertise can make a dent in this area," Mohen said.

> **"It's not a matter of simply adding another high-speed interface to the router – it also involves adding all the [SNA] emulation and controller software."**
>
> Greg Koss
> Vice president of product development
> CrossComm Corp.

Some users believe it's worth the effort.

Michael Knutson, network consultant at Hewitt Associates, LLC, a benefits company that has a large legacy IBM network as well as many LANs, said he uses NSC's channel-attach capability to enable host files to be printed on any LAN-attached printer and to back up LAN files on the host.

"We've seen significantly higher speeds from the channel, roughly twice the throughput we were getting from a [3172]," Knutson said.

DETRACTORS

But others believe the development of channel interfaces for internetwork gear is largely wasted effort.

Anura Guruge, an independent strategic consultant based in New Ipswich, N.H., said porting 3172 or 3174 functionality to a router or hub is beneficial only in small to midsize SNA nets because the devices can support only 1,000 or 254 downstream physical units, respectively.

> **"To make inroads into this area requires a heavy investment. Only those vendors that can afford the development resources and engineering expertise can make a dent in this area."**

But Cabletron's Burnhardt said those physical units, in turn, are capable of supporting hundreds more logical unit sessions.

CrossComm Corp., IBM and Wellfleet Communications, Inc. all said they have no near-term plans to support channel interfaces on their respective routers. Wellfleet said it explored the technology but decided to hold off for now.

"Right now we believe that the technology ought to be left to the IBM 3172," said David Berman, director of SNA internetworking at Wellfleet. "The 3172 is increasing in function and declining in price so swiftly that we see little savings to be gained by implementing a channel connection on our router."

IBM concurred. "We feel IBM already provides the best-of-breed products associated with the handling of SNA and TCP/IP traffic in a host-attached environment [via the 3172 line]," said Al Brandt, IBM's router planning manager. "We know channel-attach technology better than anyone so we can easily add that to our 6611 [router] should we later find that necessary," although he said the company for now has no plans to do so.

Another issue is reliablity. Some analysts and users said routers and hubs need to be more reliable before users will feel comfortable using them to replace tried-and-true IBM devices.

"This is the gateway between your host and your corporate internet, the gateway through which your mission-critical traffic will flow, so users are understandably leery of entrusting this data to a single point of failure," Guruge said.

Roy Hegge, senior network engineer at ADC Telecommunications, Inc. in Minneapolis, agreed.

"I understand the benefits of channel attachment on routers, but I'm still reluctant to stick all my eggs into one basket," he said.

Comments

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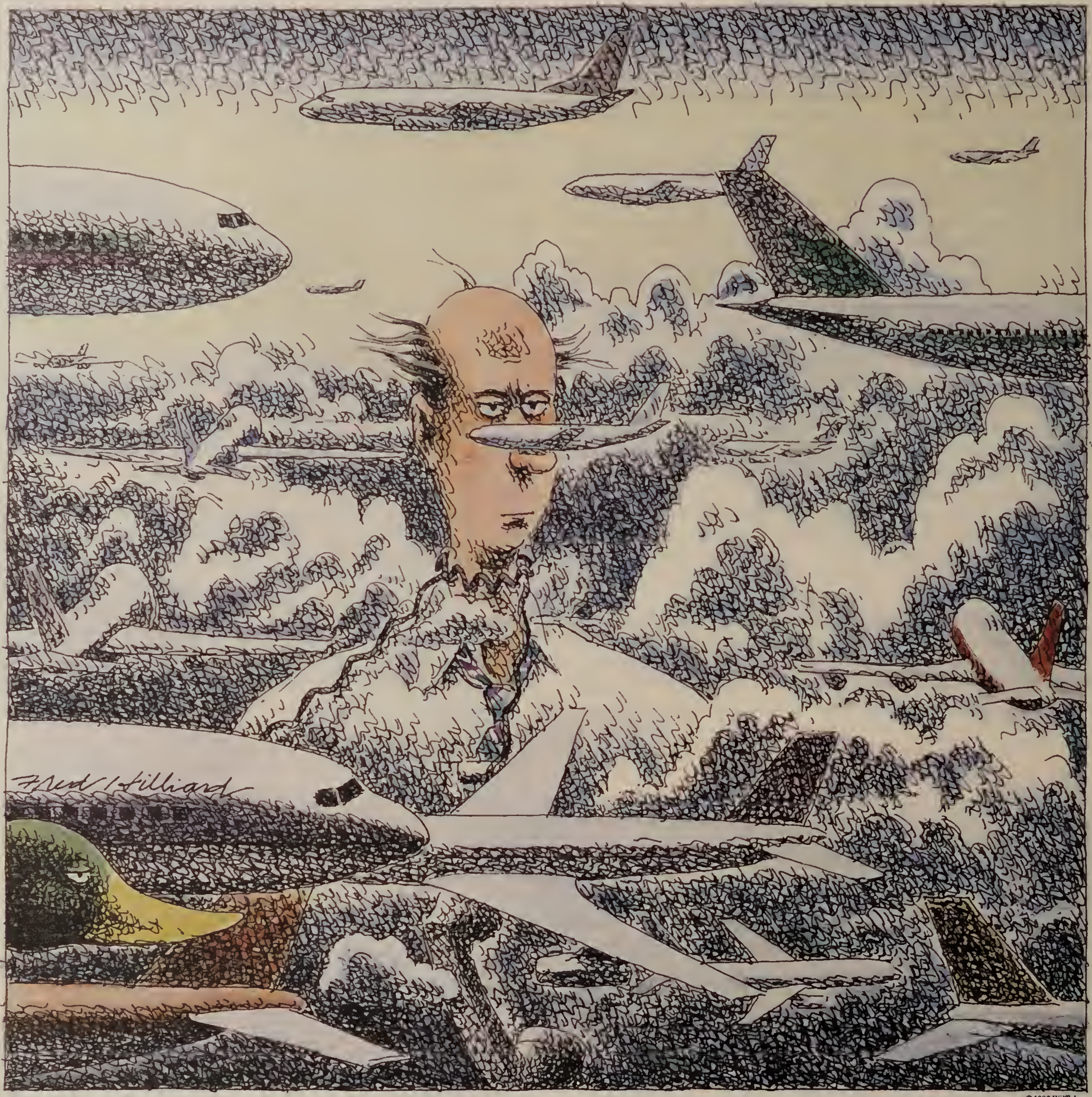

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LAN WORLD

A Special Monthly Section for LAN Decision Makers

INSIDE LANWORLD

- Merger mania begins to repaint the hub landscape. **Page L2.**
- A new breed of software distribution products will come integrated with a host of necessary inventory and management utilities. **Page L6**
- Managing the health of critical FDDI networks, a vendor's view. **Page L4.**
- Getting the most out of systems integrators, an opinion by Mark Gibbs. **Page L13.**
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Of PDAs and networks

Network hell and (eventually) user heaven.

BY MARK GIBBS

Imagine trying to manage a network when you rarely know where the PC nodes are and never know where they are going to be next.

A net where you rarely see — let alone meet — many of the users. Where personal computers sometimes connect at net speeds and sometimes at speeds as low as 1,200 bit/sec. Where nodes run a variety of new and proprietary operating systems.

If this sounds like a vision of hell, you have reason to shudder. It is going to become a part of the environment that most network managers will find themselves faced with in the next few years.

These PCs are personal digital assistants (PDA), a new breed of miniature, personal, mobile computing devices. From an overhyped beginning to the first real implementations today, PDAs are slowly emerging as moderately useful products.

Only moderately useful because the current generation of PDAs have limited storage and power and weak handwriting recognition, the feature that will make them truly useful.

For the next 12 months, PDAs will mainly be used for form-based data acquisition and limited forms of personal messaging and personal data retrieval. But time will show that to be only the tip of the iceberg.

Now that PDAs are being offered by vendors with significant market presence — such as AT&T-backed EO, Inc., which offers the the Personal Communicator, and Apple Computer, Inc., which sells the Newton MessagePad — users need to consider the implications of providing these devices with net access.

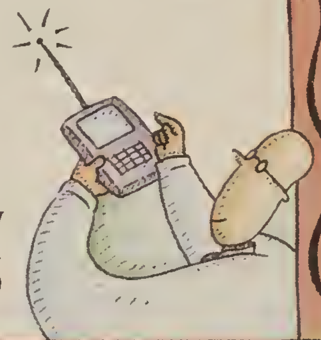
WHAT IS A PDA?

The term "personal digital assistant" was first coined by then-chief executive officer of Apple John Scully at the Consumer Electronics Show in January 1992. Scully envisioned a device that supports an individual's communication and data access needs in a mobile environment.

The most important concept was that PDAs would be flexible and adapt to the user's way of doing things, rather than the user having to adapt to the computer. This makes them ideal devices for those who are PC-resistant or require job-focused computing support.

PDAs were also conceived as highly portable devices, ideally pocket-sized

See **PDAs**, *page L10*



Firm speeds up file-transfer technology

BY CHRISTINE BURNS

Mahwah, N.J.

RAD Unlimited Networking, Inc. (RUN), recently unveiled file-transfer software that can speed the transmission of large files by up to 75% when compared to current transfer rates.

The product, called RunWay, runs on top of the network operating system in Ethernet, Apple Computer, Inc. LocalTalk, Fiber Distributed Data Interface and token-ring environments, and increases the number of packets that nodes can put on the network in accordance with bandwidth available at the time.

"File-transfer technology has not progressed in proportion with the advances that have occurred in the areas of processor speed or network technologies," said Eldad Gefen, president of RUN.

Gefen said the average network configuration uses only 30% of available bandwidth.

Because nodes transmit sporadically and for different durations, network usage varies frequently. When spare bandwidth is available, RunWay increases the output of data packets.

When implemented in servers, clients and other network peripherals, RunWay speeds up file transfers without changing existing packet formats so the packets can still be passed through an existing bridge and router infrastructure. Since there is no data compression involved, data integrity is not compromised, Gefen explained.

The first implementation of RunWay, scheduled to be released in February, will support Macintosh machines.

RunWay for Macintosh supports Macintosh machines on a LocalTalk network but only speeds up file transfers between peer machines. While it does not support increased transfer rates between a file server and a client, Macintosh end users running Runway can still access a network file server at conventional rates.

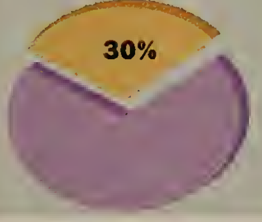
Gefen said the company plans to offer Runway for both Unix and Windows operating system environments in the second half of next year. A version of RunWay designed specifically for network printers will

See **Speeds**, *page L11*

Synernetics, HP bring Ethernet switching to work groups

HP has more than its share

Hewlett-Packard Co. is the market leader in the nonmodular managed hub arena with more than a 30% share, according to International Data Corp., a Framingham, Mass., market research firm.



BY SKIP MACASKILL

While the leading Ethernet switch vendor was gearing up to roll out a smaller version of its high-end device, one of the industry's leading stackable hub players was busy adding Ethernet switching to its line.

Hewlett-Packard Co. last week bolstered its stackable hub offerings by rolling out a new Ethernet switch for high-performance work groups that delivers dedicated 10M bit/sec bandwidth pipes to the desktop.

Synernetics, Inc. is expected to follow up that announcement this week when it unveils a scaled-down version of its high-end LANplex 6000 intelligent switching hub.

The new LANplex 6004, a four-slot version of Synernetics' LANplex 6012 12-slot device, is designed for use in departmental local-area networks. It offers 3.2G bit/sec of capacity as well as all the features of the 6012, including dedicated 10M bit/sec Ethernet connections to the desktop, Fiber Distributed Data Interface concentration, intranetwork routing capabilities and Simple Network Management Protocol support.

While the 6004 is geared toward department use, it can also be used to provide switched Ethernet connections between existing wiring hubs. In the future, the 6004 will offer switched FDDI functionality and a direct connection to Asynchronous Transfer Mode (ATM) switches, offering users even greater aggregate bandwidth.

See **Switches**, *page L11*

BRIEFS

Exide Electronics Group, Inc. last week rolled out OnliNet 3.0 NVX, net power management software that provides real-time information about the quality of incoming power in NetWare or mixed NetWare/Unix environments. The software, which runs on a net management console anywhere on the net, monitors and records performance data from the uninterruptible power supplies (UPS) in place. OnliNet also provides automatic shutdown and start-up services following a power failure by engaging the external batteries in the UPS.

The firm also rolled out a new line of high-performance UPSs, dubbed PowerWare Prestige Extended (EXT). The Prestige EXT models — 1000, 1250 and 1500 — offer similar features to Exide's other PowerWare UPSs but increase base battery time by 40%, providing 10.3 minutes of backup time at 100% capacity and 25.2 minutes of backup at 50% net load.

Available now, the UPSs cost from $1,199 to $1,499.

Exide: (800) 554-3448.

Thursby Software Systems, Inc. (TSS) last week announced a new version of its TSSnet for Macintosh software package that includes a virtual disk capability so Macintosh users can access a remote file on a Digital Equipment Corp. DECnet network as though it were a local disk. The new feature will eliminate the need for Macintosh users to purchase a dedicated AppleTalk-to-Ethernet router to handle DECnet traffic, giving users access to electronic mail, terminal-emulation and file-transfer services.

TSSnet 2.6 is available now and costs $249.

TSS: (817) 478-5070.

MERGER MANIA

Reshaping the hub/router landscape

BY KIM MYHRE

Chipcom Corp.'s recently announced plan to merge with Artel Communications Corp. capped off a run of hub and router company mergers and acquisitions that characterize an industry undergoing a dramatic transformation.

These two still rapidly growing markets are entering a maturing phase characterized by high-end/low-end product fragmentation, heightened competition and continued advances in functionality and performance, all of which is driving consolidation through partnerships.

The Chipcom-Artel deal and others like it — Bytex Corp.-Network Systems Corp., SynOptics Communications, Inc.-Coral Network Corp. and Crescendo Communications, Inc. skip-Cisco Systems, Inc. — are just the tip of the iceberg. Research firm International Data Corp. expects to see many more hub and router vendors pair off with each other and with data communications equipment suppliers and carriers over the next few years.

Today, there are more than 50 vendors selling intelligent hub products worldwide. Most of these companies entered the market in the last few years, and new competitors continue to join the fray.

For example, data communications equipment vendors such as Penril DataComm Networks, Inc., Multi-Tech Systems, Inc. and Network Equipment Technologies, Inc./Adaptive Corp. are seeking market share opportunities, and traditional personal computer local-area network adapter vendors such as Standard Microsystems Corp. and Asante Technologies, Inc. are moving into the high end of the hub market.

Competition in the next few years will get bloody as these new players battle the established hub and internetwork players.

Vendors will be scrambling to differentiate their products, sustain distribution channel mindshare, maintain margins as low-end prices continue to decline, and fund high-paced product innovation and the accompanying service organizations necessary to support the products.

Today, there are more than 50 vendors selling intelligent hub products worldwide. Most entered the market in the last few years, and new competitors continue to join the fray.

As pressures intensify, the hub market will continue to polarize into high- and low-end segments. Each of these segments will have their own set of competitive challenges, but it is in the upper echelon that the most change will occur.

The dynamics of the high-end modular hub market are being defined by the integration of switching technology and routing capabilities, among other things.

Companies scramble to flesh out their products by integrating new capabilities.

To meet the demands of bandwidth-hungry applications, hub vendors are scrambling to roll out new products that incorporate Ethernet switching — the ability to dedicate 10M bit/sec of bandwdith to each port — adding Asynchronous Transfer Mode (ATM) backplanes and modules, and building in software-based port switching (see graphic, this page).

While Cabletron Systems, Inc., SynOptics and Ungermann-Bass, Inc. have developed or are developing their own switching technologies, Chipcom is acquiring the technology by merging with Artel and Optical Data Systems, Inc. (ODS) is licensing it from Kalpana, Inc.

ROUTING THRUST

On the internetwork front, many hub companies are looking to integrate routing functions into their boxes to meet the increasing need to support a complex mix of network protocols.

Routing has emerged as a primary solution to link diverse and geographically dispersed network resources, and IDC has forecasted double-digit growth rates for routers over the next five years.

Hub vendors want to integrate routing functions for a number of reasons: the hub is a logical point of integration at the physical level, there are potential gains in integrating network management, putting the router in the hub could boost performance and, of course, hub manufacturers can make money at routing.

But the question is when and to what level will routing be integrated into the hub. For instance, if high-performance routing ultimately becomes an integral part of hub architecture, router vendors have a fair amount to lose.

In 1993, more than 30 vendors manufactured and sold routers worldwide, representing more than twice the number of competitors in 1990. Revenue growth during this period was dramatic, making small companies large and entrepreneurs rich.

And the future for router manufacturers continues to looks bright. The router market is expected to continue to be one of the fastest growing and most competitive segments of the networking industry. So the issue of hub-based integrated routing will have far-reaching ramifications for players in both markets.

TWO APPROACHES

In general, there are two basic scenarios for the integration of routing functionality in the intelligent hub. The first, the easier of the two, involves card-level router modules that fit into the hub chassis.

Functionally this is not much different than leaving the router outside the hub, except that card-level integration allows the sharing of power supplies and potentially provides tighter integration of network management.

Many card-level router products exist today, but most focus on the low end. Examples include Cisco's IGS card router for SynOptics, Cabletron and Chipcom; ACC's router card for UB; and Proteon, Inc.'s routers for its hub. In 1993, about 5% to 10% of router shipments were card-level products.

The second type of integration, which is more technically complex, is referred to as functional integration or the "God box" approach. In this case, router functionality and wide-area access are actually integrated into the architecture of the hub.

Comparison of switching hubs from leading vendors

Vendor	Product	Price/port; number of ports	Backplane (bit/sec)
Asynchronous Transfer Mode			
Adaptive Corp.	ATMX	$2,700; 90	1.2G
Fore Systems, Inc.	ASX Series	$2,995; 16	2.5G
		$2,495; 64	
Newbridge Networks, Inc.	Vivid ATM Hub	$5,000; 8	600M
SynOptics Communications, Inc.	LattisCell	$1,495; 16*	5G
		$2,000; 16**	
Ethernet switching			
Alantec Corp.	PowerHub	$2,300; 12	400M
Artel Communications Corp.	Galactica	$1,400; 32	1.0G
Kalpana, Inc.	EtherSwitch	$700; 5	150M
Standard Microsystems Corp.	ES1	$1,650; 20	800M
Synernetics, Inc.	LANplex5000	$1,700; 88	300M
3Com Corp.	LinkBuilder 3GH	$1,700; 88	300M
Ungermann-Bass, Inc.	DragonSwitch	$900; 16	300M
Port switching			
Bytex Corp.	7760	NA	NA
Chipcom Corp.	OnLine	$600; 4	NA

* Shielded twisted-pair wiring

** Fiber

NA = Not available

SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.
GRAPHIC BY BERTHA A. SUAREZ

Nearly all the major suppliers of hubs have pledged some level of functional integration of routing in their next-generation hubs, most of it through deals with other vendors.

The deal making was kicked off when industry leaders SynOptics and Cisco — SynOptics with more than 21% of worldwide intelligent hub port shipments in 1992 and Cisco with more than 40% of worldwide router sales the same year — teamed up to develop the RUB system.

This alliance could have resulted in a strong market force, but the two companies later scrapped the joint venture claming technical infeasibility. More likely, the two companies realized they were going to cannibalize each other's market opportunities.

SPLITTING UP

Since the breakup, SynOptics has acquired Coral, a smaller, less threatening router vendor, while Cisco turned to hub newcomer Crescendo, in an attempt to make feasible what they were not able to do together.

Other relationships have followed this lead. Hughes LAN Systems, Inc. has partnered with Wellfleet Communications, Inc., Chipcom is relying on IBM, and ODS is teaming with Wellfleet and Cisco. Cabletron has relationships with both Wellfleet and Cisco but is also developing its own next-generation routing technology. 3Com already has its own routers.

Hub vendors will accelerate the integration of routing into their increasingly multifunctional products as they attempt to position the hub as a primary WAN access point.

Hub vendors will accelerate the integration of routing into their increasingly multifunctional products as they attempt to position the hub as a primary WAN access point.

In a recent IDC study, customers overwhelmingly indicated a preference for using router-based technology for WAN access. By incorporating routing and high speed backplane swtich technology, the hub may become a more viable WAN access option.

The emerging high-end, multifunction intelligent hub will not only have the WAN access flexibility of routers, but the power of integrated switching and multiprotocol flexibility. In short, the features and functions of several previously separate devices.

The multifunction internetwork access device will emerge, but it will not reign. The continuing fragmention of the market reflects the diversity and complexity of customer requirements.

Vendors of routers, hubs and other types of data communications equipment will continue to compete in one market segment while working together in other segments. Continued technology convergence, more market segmentation and ever-increasing competition will result in better technology, stronger suppliers and market growth. These dynamics will bring both challenges and opportunities to vendors and their customers in the rapidly evolving market.

Myhre is a senior vice president with International Data Corp. in Framingham, Mass.

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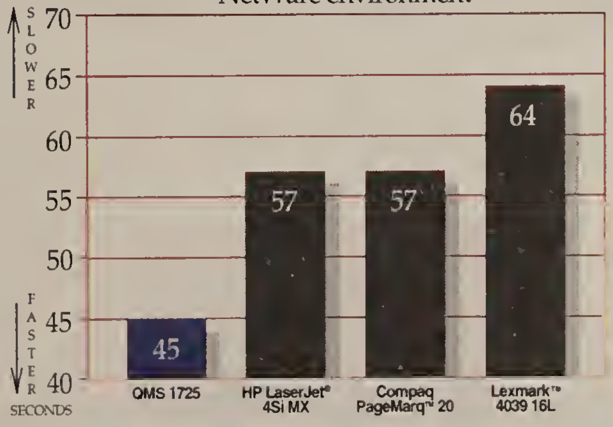

*Source: MWA Consulting, June 1993.

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Circle Reader Service #6

Managing the health of your FDDI network

BY FRANK ACTIS AND SUNIL BHAT

Many network managers today are installing Fiber Distributed Data Interface as high-speed backbone networks or to support the latest high-speed workstations and superservers.

Because of the critical nature of these environments, the health of the network is often more important than it is in a typical Ethernet or token-ring shop. The ability to manage network colds and flus will prevent life-threatening (or at least job-threatening) network failures and outages.

Although the fault-tolerant nature of FDDI will keep the network alive during various faults, it is important to understand not only how to isolate where those faults exist, but also to learn if they do exist. If the network is in fault recovery mode and another fault occurs, the net will most likely segment into separate rings with no connectivity between them.

While similar to the IEEE 802.5 token-ring standard, FDDI is different in several ways, besides the obvious difference in speed — 100M compared to 4M/16M bit/sec.

One key difference is that FDDI allows for dual, counterrotating rings. The primary ring carries the data, while the secondary ring is used for continuity when there is a node or fiber segment failure. Dual-attached stations are attached to both rings. When a problem occurs, data is routed around the problem via the secondary ring.

FDDI's higher frame rates and some of its other unique operating characteristics make troubleshooting FDDI different from token-ring, as well. Luckily, FDDI has the Station Management (SMT) process to help.

SMT controls the actions of FDDI and its sublayers, how stations connect to each other and how the ring is initialized. SMT also has its own unique frames that exist on the local-area network to manage neighbor notification and error reporting.

A Management Information Base (MIB) also exists that may be queried by management stations — usually protocol analyzers or special management applications. The information acquired by querying a device is crucial to understanding the health of the FDDI ring and to solving problems on the ring.

VENDOR VIEW

As with other LAN technologies, basic frame counts and utilization information is a first step to understanding FDDI health. High-speed protocol analyzers for FDDI can perform these functions, but users should beware of implementations that use off-the-shelf hardware because standard network interface cards cannot keep up with FDDI frame rates and do not have the required simultaneous transmit and receive capabilities.

In particular, the rate of claim and beacon frames can provide information as to what is happening to the ring. If a token is lost or if certain timers expire, only a few claim frames are typically seen. However, if a station is entering or has left the ring, thousands of claim frames — and perhaps a few beacons, as well — are often seen.

In addition to recovering the token, the claiming process allows the network's performance to be tuned for different types of applications. As each station joins the ring, stations negotiate how often they want to see the token.

Video or client/server applications would want to see a faster token rotation, while file-transfer applications would prefer a longer rotation interval in order to increase throughput.

The station requesting the fastest token rotation time will set the configuration for all stations on the ring.

Note that it is possible with frame analysis to see which station won the claim process, but it is very difficult to understand why claiming was started to begin with. SMT analysis is very useful in understanding who started the claim process and why.

Another frame analysis technique is to look for errored frames. SMT analysis can help locate the actual source of errored frames.

TO LEARN, JUST LISTEN

Most SMT analysis is passive, monitoring Neighbor Information Frames (NIF) and Status Reporting Frames (SRF). These frames indicate the logical upstream network neighbor, station type and basic device status.

This information is useful but not sufficient to really understand the nature of FDDI problems. NIF frames show stations in a logical, token-flow configuration. This logical view is not necessarily how the devices are actually connected.

These frames also lack detailed port and media access control (MAC) information to aid in troubleshooting. To get this information, applications must query an FDDI device's SMT MIB.

The key to understanding FDDI topology and device status is with interactive SMT query/response applications.

In order to query a device's SMT MIB, protocol analyzers should be able to send and receive simultaneously, filter specified frames, and decode SMT Version 6.2 and 7.2.

Unix and DOS applications may need special device drivers to allow access to SMT information. Specialized applications are needed to correlate neighbor information with port and MAC data.

The first device you should query is your own. Since all devices have an SMT MIB, some

See FDDI, *page L8*

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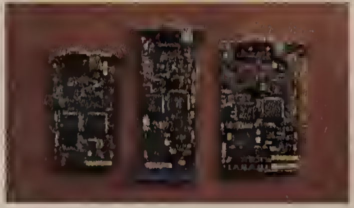

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Circle Reader Service #3

Software distribution tools taking shape

KEVIN McFADIN

BY JOANNE CUMMINGS

When the Medical Center of Delaware installed its SNA/LAN internet to link 3,700 personal computers to Novell, Inc. NetWare servers and hosts from IBM, Data General Corp. and Digitial Equipment Corp., one of the first tasks it faced was finding a reliable software distribution tool.

"When you have a network of our type where we're using PCs as a universal workstation, you have to run different software and drivers and so on to get to all these different boxes," said Stan Fiedor, manager of data communications at the center. "We realized right up front we needed a way of managing that software so we could make changes reliably from a central location."

In the end, however, the center had to design its own distribution tool, called the Workstation Support System.

"It gets very complex with the number of workstation types we have and the protocol stacks we're running, so the design has to be done carefully," Fiedor said. "That's been a real challenge for us. You can't just get that from a vendor because I don't think most vendors understand the problem well enough."

The center's homegrown tool, which runs on a centralized server, checks each PC when they boot from their local server to ensure that the software is current and properly configured. If it is, the PC is allowed to boot normally. If something is awry, the Workstation Support System replaces the software and then allows it to boot.

"When you have a large PC network, if you don't have something like this, you're stuck with going out and doing all this manually, which would be a nightmare," Fiedor said.

According to Valerie DeRusso, director of network services for Omicron, a network consultancy in Philadelphia, the case of the medical center is not unique. Most of her clients have yet to find an off-the-shelf software distribution package that can handle the intracacies of their net environments.

"We haven't found any products that meet users needs completely," DeRusso said. "We've had to write our own custom utilities for each client environment."

WHERE WE STAND

The bottom line is that software distribution products alone are not the answer.

In today's complex local-area network environments, users need software distribution products that incorporate key utilities such as license management and application metering, as well as which can inventory software and hardware on the net. The products also need to be manageable by enterprise management systems such as IBM's NetView/6000 or Hewlett-Packard Co.'s OpenView.

License management is a logical extension to software distribution because it is used to monitor how many copies of licensed software are in use and prevents LAN users from exceeding the software's licensed limit.

Similarly, application metering tracks the number of applications on the LAN, ensuring that only approved applications are running. And integrated inventory products enable managers to see what is out there already and which machines can actually support the software to be distributed.

"There are a huge number of users clamoring for software that bundles together distribution, licensing and license management," said David Cappuccio, program director for local-area communications at Gartner Group, Inc., a research firm in Stamford, Conn.

According to Cappuccio and other analysts, a couple of products expected to hit the market in the next six months should provide the suite of integrated capabilities needed.

HERMES ON THE HORIZON

One of the new products is a Microsoft Corp. offering code-named Hermes and also referred to as Microsoft Systems Management (MSM).

MSM, expected in the first quarter of 1994, will be a desktop and systems management product. According to Microsoft, MSM will run on Windows NT Advanced Server and perform license management and software distribution for a variety of servers, including LAN Manager, NetWare and IBM LAN Server, as well as DOS, Windows, Windows NT, Apple Computer, Inc. Macintosh and IBM OS/2 clients.

The key to the product will be its integrated SQL database, which will be used to inventory software and hardware on every server and client on the network. "All the LAN resources, in terms of hardware and software, are stored in a central repository," said Dan Shelly, group product manager for enterprise systems at Microsoft.

"This means you can query that database to find out things like how many 386s you have with 40M-byte hard drives, or how many of them have 4M bytes or less of memory. You don't have to go through reams of paper and reports to find that information."

This is important because it will enable LAN administrators to distribute software to only those machines that have the appropriate resources.

Besides LAN protocols such as Internetwork Packet Exchange/Sequenced Packet Exchange (IPX/SPX), MSM will support a number of wide-area network protocols, including IBM Systems Network Architecture, Integrated Services Digital Network, Transmission Control Protocol/Internet Protocol and X.25.

New products integrate utilities needed to make distribution successful.

"That means you can actually go to a different machine and do all of your management of [MSM] across the network," Shelly said. "Administrators can hook into [MSM] and not only pull out the information they're looking for, but also make changes to the system."

MSM will also support remote diagnostics by enabling administrators to view remote client workstations. "With [MSM], you could take a look at a remote user's screen and take control of their workstation remotely," Shelly said. "Then you can do things to try and correct the problem without ever leaving your desk."

Microsoft recently announced that IBM and DEC would be incorporating MSM into the NetView/6000 management system, and that HP would be doing the same with its OpenView product. "That lets them take advantage of the information in [MSM] and integrate that information and the software distribution capabilities into their network management products," Shelly said.

Those features will be available early next year. Microsoft also makes available application program interfaces that enable other vendors to write similar hooks into their management systems.

Analysts are cautiously optimistic about MSM. "Lots of folks are waiting for it to come out," Gartner's Cappuccio says. "The hype has been so much that people can't wait to see a product, but we still don't know if it's going to work."

Still, Cappuccio says the IBM-DEC-HP support is a plus. "Now you can manage your entire network, including distribution, using a combination of NetView/6000 and [MSM] or OpenView and [MSM]," he said. "That won't be available until 1994, but it's a step in the right direction."

Pricing for MSM has not yet been announced.

BRIGHTWORK DEVELOPMENTS

The other contender for the software distribution spotlight next year is a new product expected from Brightwork Development, Inc., a software vendor in Tinton Falls, N.J. Although the firm declined to comment beyond saying it would be rolling out a new product in January, analysts expect the tool to be much like MSM.

"It will do an automatic inventory of all the clients and servers on your network," Cappuccio said. This would include hardware items such as the disk size on every machine and the type of CPU. It would also collect information about the software running on those machines, create a baseline profile for each machine and store it in a relational database.

"Any time the client logged on to the network, the software would automatically take another inventory and compare it to the baseline," Cappuccio said. "This gives users an automated way of telling what software has been changed, added, deleted, if there is nonlicensed material out there, or even how often software was used and by whom."

If something is amiss, the product will be able to send alarms up to NetView/6000, OpenView or Novell's NetWare Management System (NMS), he said. "Once you've created this database, you can start doing software distribution because you know what clients are out there, you know what their machines look like, what their capacities are and what applications are already there," Cappuccio said.

"It looks like it's really designed for large LAN environments, but I would suspect you should be able to scale it pretty easily," Cappuccio said. The first release will work only with NetWare servers but will accommodate any clients, including DOS, Windows and Macintosh.

Greg Gianforte, president of Brightwork, declined to comment on the product but said his company realizes the importance of an integrated asset management database for LAN

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software distribution.

"Every desktop in a large LAN environment is a little different, and unless you can direct the distribution based on what you know is on those desktops, you'll have a catastrophe," he said. "One customer we work with had almost a 30% failure rate because they couldn't do directed distribution."

The failures can be traced to a variety of factors, Gianforte said. "It might be because one person has a CDROM driver loaded in their config.sys," he said. "Or somebody else doesn't have enough disk space, and somebody else has got Flight Simulator on their machine. This is all outside the manager's control in many cases. If you can direct your outputs to certain sets of people who you know match the criteria, you've won half the battle."

In addition to comparing the inventory to the baseline at each login, the product will be able to automatically roll back users' config.sys and autoexec.bat files to their proper settings if unauthorized changes have occurred.

"Say you have somebody in the company who thinks they're a super user, and each Monday morning they come in with something new," Gianforte said. "When they install it, it changes their autoexec.bat or their config.sys, and now the system doesn't work and they call up complaining to the administrator. Wouldn't it be great if there were a method so that each time they logged in, their autoexec.bat and config.sys got set back to where it was before?"

According to Microsoft's Shelly, MSM will be able to perform similar tasks. "Administrators could use Hermes to find all the machines that have a Games subdirectory on them and delete them, for example," he said. "But that wouldn't make them overly popular."

ENTER NOVELL

Another contender is Novell, with its NetWare Navigator and Network Navigator products. Although the Network Navigator has been shipping since 1988, Novell just unveiled its NetWare-specific version called NetWare Navigator at the recent NetWorld 93 Dallas show.

According to Barbara Goldworm, the NetWare Navigator is an integral part of Novell's recently announced NetWare Distributed Management Services (NDMS) strategy. Under NDMS, Novell has integrated several LAN and desktop management products and utilities, one of which is software distribution provided by the NetWare Navigator.

"The motivation behind NDMS is to pull together all these management services, like administration, backup, distribution and licensing, under one common strategy because we believe that's what's required for customers to be able to manage their complex environments," she said.

Within NDMS, Novell is planning to integrate software distribution with licensing and inventory management, although the integration of an SQL inventory database is not expected until some time next year.

In addition, Novell is offering third-party partners a software developers' kit that enables them to license-enable applications to run under NetWare. "The licensing service, Netware Navigator and the inventorying capability are currently separate, but they are all key parts of NDMS," Goldworm said.

The NetWare Navigator can also be linked to enterprise management systems such as OpenView and NetView/6000 and Novell's NMS.

Goldworm says Novell has no plans to incorporate NetWare Navigator directly into the network operating system (NOS) and will continue to sell it as a separate product.

"One of the criteria we use to decide if something becomes part of the NOS is if it's something that all users require," she said. "Storage management and backup are part of the NOS because everybody has to do backup. Management of users and groups is something that has to be there in order to use NetWare, so that is part of the operating system. But software distribution is still one of those things that not everyone wants, so to add the complexity and cost involved into the operating system doesn't seem to make sense today."

NetWare Navigator, which is currently available, can distribute software to DOS, Windows and OS/2 clients on NetWare 3.0 or 4.0 LANs. When used with other Network Navigator products, however, it can also work with any other type of LAN environment, Goldworm said. In addition, there are products in the line that can run on IBM or Tandem Computers, Inc. systems and enable users to download software from hosts to connected LANs.

Pricing ranges from $995 for 20 users to $30,000 for 2,000 users, although larger installations are easily supported, Goldworm said. "It's completely scalable," she said.

Once these products appear, users should have a broader range of software distribution options to pick from. The integration of inventory databases with license management and application metering will offer users the flexibility and control such products have lacked until now, analysts say.

Still, seeing is believing. Since none of these products is actually available today, it's difficult to gauge their aptitude for handling today's complex LAN environments.

→ Cummings is a free-lance writer in Marlborough, Mass.

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Print server market heats up with new, less costly products

BY CARYN GILLOOLY

Some of the leaders in the LAN-based print server market rolled out products last week that give users capabilities ranging from support of multiple transport protocols to support of multiple network operating systems (NOS).

Topping the list, Digital Products, Inc. announced a number of products, including the four-port, high-end NetPrint/200 print server for mixed network environments.

On the Unix side, Pacer Software, Inc. brought out an upgraded version of its PacerPrint print server that now includes enhanced management and integration capabilities with other Unix-based systems.

Vendors serve up printing

Company	Product	Price	Availability
Axis Communications, Inc.	NPS 550	$695	Now
Digital Products, Inc.	NetPrint/50	$395	Now
	NetPrint/100	$549 (Ethernet version)	Now
	NetPrint/200	$995	Now
Pacer Software, Inc.	PacerPrint	$3,000 for 20-user license	Now

GRAPHIC BY TERRI MITCHELL

And Axis Communications, Inc. added Microsoft Corp. LAN Manager and IBM LAN Server support to its NPS 50 multiprotocol print server (see graphic, this page).

DIGITAL PRODUCTS

Digital Products' NetPrint/200 is a small box that connects directly to an Ethernet 10Base-T net on one side and offers four parallel or three parallel and one serial printer ports on the other.

The NetPrint/200 simultaneously supports Novell, Inc. Internetwork Packet Exchange (IPX), Apple Computer, Inc. AppleTalk and Transmission Control Protocol/Internet Protocol users, letting users on any of these networks send print jobs to any of the four attached printers.

"This is a high-level product that lets all four printers support all protocols concurrently," said Fred Schlaffer, senior vice president at Digital Products, based in Waltham, Mass.

The NetPrint/200 also supports various versions of Unix, including SunSoft, Inc.'s Solaris, Digital Equipment Corp.'s Ultrix, AT&T's Unix System V Release 4, Hewlett-Packard Co.'s HP-UX and IBM's AIX.

According to Schlaffer, although this is the first release of the product, enhancements to NetPrint/200 are on the way. The company plans to bring out a token-ring version in the first quarter next year and is currently working on adding LAN Manager and DEC Local Area Transport (LAT) support.

On the low end, Digital Products released the NetPrint/50, a print server that connects a single parallel printer directly to a 10Base-T Ethernet net running NetWare 2.X, 3. or 4.. At $395, the company claims that the NetPrint/50 is the lowest priced print server available.

Digital Products also upgraded its NetPrint/100 print server, which previously only supported IPX, by adding AppleTalk and TCP/IP suport.

PACER, AXIS

Pacer, based in La Jolla, Calif., has added a utility called PacerAdmin to its PacerPrint print server.

The PacerPrint print server integrates Macintosh and Unix printing resources by enabling Macintosh users to access Unix print queues and list, delete and move print jobs. Previously, administrators could not easily access Unix print information from a Macintosh.

Lastly, Axis Communications added both LAN Manager and LAN Server support to its existing NPS 550 print server.

The NPS 550 is a multiprotocol product that lets users on Ethernet-based NetWare, TCP/IP, AppleTalk and now LAN Manager and LAN Server nets share printers.

According to President Lester Yetton, Axis plans to add support for Windows NT to the NPS 550 during the first half of next year.

✆Digital Products: (800) 243-2333; Pacer: (619) 454-0565; Axis: (508) 777-7957.

Low-cost fault tolerance for NetWare servers bows

StandbyServer designed for users that can tolerate short-duration outages.

BY CARYN GILLOOLY

Vinca Corp. last week introduced a product designed to give Novell, Inc. NetWare users better fault tolerance at a reasonable price.

Called StandbyServer, the new offering is a hardware/software product that lets NetWare 3.X and 4.X administrators mirror network data to a dedicated or nondedicated personal computer acting as an on-line spare.

At first glance, StandbyServer seems to offer what Novell's System Fault Tolerance (SFT) III offers, but it requires manual intervention and, hence, is less expensive.

According to Vinca President Jay Carlson, StandbyServer addresses users that can afford to have servers go down for a few minutes, during which time someone has to throw a switch in order to activate the secondary server.

"SFT III addresses those users that need nonstop computing — those users that say their servers can never be down," Carlson added. With SFT III, the switch from one server to the other is automatic and instantaneous.

StandbyServer comprises a NetWare Loadable Module (NLM) as well as a StandbyServer Link card for the primary server. That box is then linked to the secondary server via a high-speed, bidirectional serial link cable.

The secondary server also has to be outfitted with a link card as well as a DOS application that governs the server's operation.

Once attached, the secondary server stays on all the time. The NLM on the primary server mirrors data to the PC across the link.

The DOS program on the secondary PC provides emulation that makes that drive appear as a NetWare volume.

If the primary server fails, the administrator only has to switch to the secondary server.

According to Carlson, one of the benefits of StandbyServer is its low cost.

Many other mirroring solutions — such as SFT III — require identical hardware for both the primary and secondary server. StandbyServer can use any PC capable of running NetWare.

"Organizations can press old file servers or workstations back into use as standby machines," he said. "StandbyServer can even run in the background on a lightly used, nondedicated workstation."

In addition, because the software is a DOS application, it does not require administrators to run extra copies of NetWare, which is the case in many other fault-tolerant products.

StandbyServer is available now for $1,695 for the Industry Standard Architecture (ISA) version and $1,995 for the Extended ISA version.

✆Vinca: (801) 223-3100.

FDDI

Continued from page L4

applications can programmatically analyze their own MIB. The first MIB variables to examine at are the negotiated token-rotation time, also known as T-Neg, and the ring operational count, Ring-Op.

T-Neg will tell you the requested token rotation time that was decided on during the claiming process. The Ring-Op parameter in the SMT MIB maintains a record of the number of times the ring goes from nonoperational to operational.

Active querying using Status Information Frames as well as Parameter Management Frames provides a means of getting specific information from the SMT MIB on demand.

The information from these MIB lookups are useful in status monitoring and in troubleshooting. Such applications can create a physical map of the network. These maps allow the net manager to look at a device, such as a concentrator, and understand which devices are connected to which ports, as well as port status and link error information.

Protocol analyzers also provide the real-time observed Target Token Rotation Time, which is the actual time between successive tokens at any point on the ring. This is a measure of the frequency at which a node of the ring is being serviced. When it takes twice the T-Neg time for the token to be received by a station, the ring will reset and the claiming process will begin.

The information from these MIB lookups are useful in status monitoring and in troubleshooting.

Other data available via the SMT MIB deal with MAC and port counters and status. Only through the SMT MIB can a user discover if an interface is active, disconnected or somewhere in between. Port-by-port error counts are available, as well as counts for each MAC in the station.

The MAC counters include frames transmitted and received, as well as errors detected by this MAC but no other MAC. This data allows you to isolate the real location of a marginal fault.

UNDERSTANDING FAULTS

Once the location of a failure is isolated, there are several issues to consider when determining the cause. First of all, there may be several reasons why FDDI devices refuse to connect. The fiber may be faulty or the devices themselves may be refusing the connection.

To connect, FDDI interfaces exchange configuration information and perform a link certification test (LCT) before joining the ring. Dual-attached stations have A and B ports (Port A is the primary ring in and secondary ring out), while single-attached stations have a Type S port, which attaches to a concentrator's M port.

Backbone FDDI rings connect A ports to B ports. When misconfigurations occur and A-to-A and B-to-B connections exist, the ring becomes twisted and stations disappear from the primary ring, even though they are physically connected. Some FDDI implementations may accept undesirable connections, which would make it difficult to find problems.

At the connection level, Link Error Rates (LER) are of prime importance while troubleshooting link problems. The LER estimate is a statistic that indicates the reliability of the link. If the LER estimate exceeds the LER alarm value, an SRF frame is sent to the SRF multicast address and on exceeding the LER cutoff value, the link is rejected.

TEST TOOLS

There are two types of test tools that are available to isolate the actual cause of the failure — port testers and fiber power meters. Port testers utilize a subset of SMT and the lower sublayers of FDDI to troubleshoot FDDI ports and connections.

They give the network manager a view of the handshake between two FDDI ports and of the LCT. Port testers are helpful in isolating connection problems from link problems, especially since many connection problems may look like bad links. They also may have an automatic test suite to exercise the device's ability to perform the FDDI connection sequence correctly.

The last step in problem isolation is typically with a fiber-optic power meter. By measuring the amount of light loss though a single strand of fiber, you can tell if there is a physical problem in the media itself.

Monitoring FDDI LANs and being able to troubleshoot them quickly will ensure a high quality of service to your customers. While traditional packet analysis and statistics are also used, interactive SMT analysis by specialized applications is key to minimizing problems on your FDDI network.

Actis is a product manager and Bhat a software engineer at Hewlett-Packard Co.'s Network Test Division.

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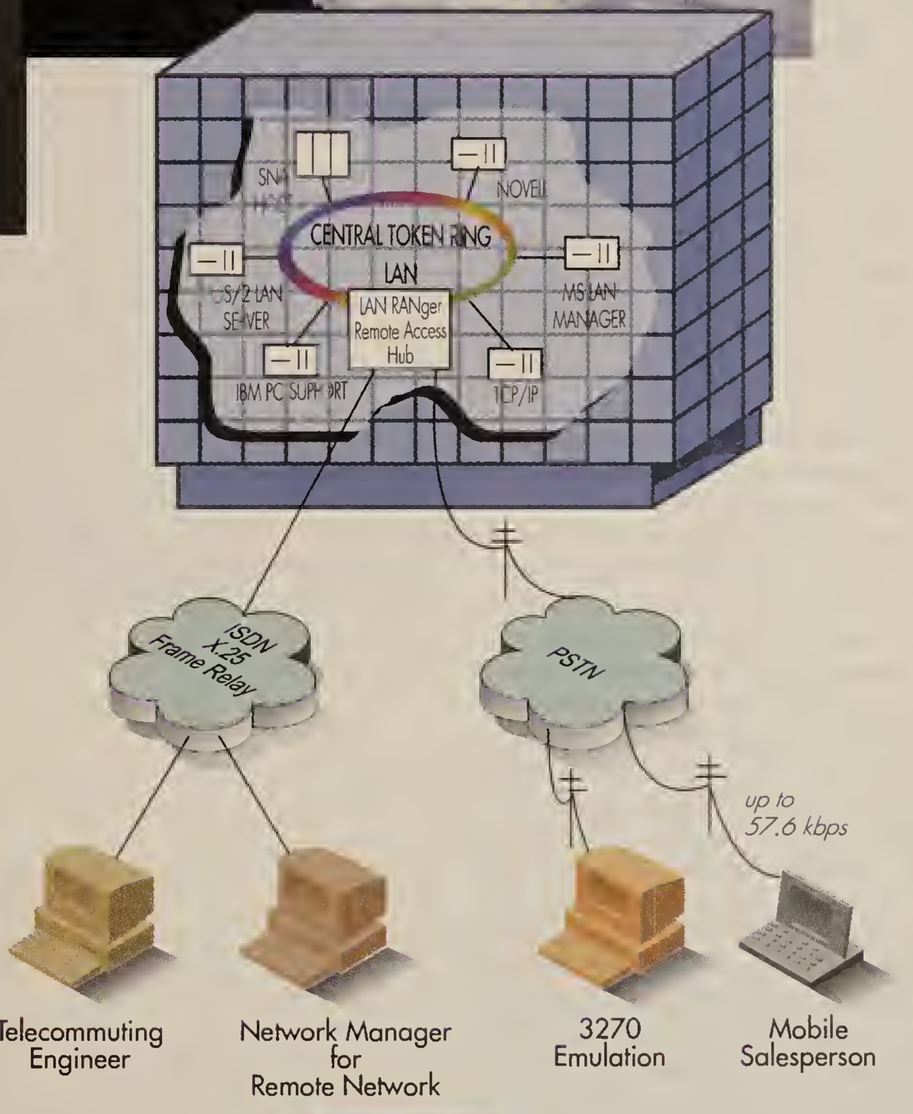

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Circle Reader Service #2

PDAs

Continued from page L1

or smaller.

Despite this general definition, some people still refer to portable computers with 100M-byte hard disks that run standard applications under DOS or Windows and support pen-based operating systems as PDAs. While these systems have some features in common with PDAs, this definition misses the point.

PDAs are not intended to be general-purpose computers. They are task-centric and support activities such as time management, memo-length communication and low-volume data filing and retrieval from remote sources.

This means that their local, on-board storage can be minimal, and most of their computing power can be concentrated on the user interface and communications management.

While some PDAs have keypads and are appropriately included in the product category, PDAs typically have a pen-based user interface to improve ease of use. The interface allows a computer to be controlled by a stylus that acts as both a mouse and a drawing device.

In mouse mode, the pen is used for pointing and selecting. As a drawing device, it produces "electronic ink" on the screen. If the input is handwriting, it can be sent to handwriting recognition software that tries to convert it into ASCII data that the computer can handle.

Although more PDAs reach the market with the passing of each month, the handwriting conversion software is still weak, a shortcoming that will likely be addressed in coming years.

PDAs are also still lacking full-function network connections. To make PDAs really useful they must be capable of communicating anytime, anywhere and to anyone (at least anyone who is digitally equipped).

The primary uses of PDAs will be as personal information organizers: a personal "agent," a term used for systems that learn the habits and interests of their user and customize themselves accordingly; a personal communications device, a cross between a telephone and a computer; an intelligent electronic book, particularly when combined with CDROM technology; an electronic notepad and an entertainment device.

Although Scully predicted PDAs would become mass market products, they are not ready for that market yet. Until the handwriting recognition software and net services are available, PDAs will have a much more limited market. Look for real PDAs that fulfill Scully's original vision in perhaps two years or so.

NETWORKING PDAS

There are, however, a number of devices that can be called PDAs today. The most publicized is arguably the Apple Newton, currently in its first release as the Newton MessagePad.

The MessagePad is a pocket-sized device with pen-only input. It has some nice user interface features, although the poor performance of the handwriting recognition has attracted much criticism.

Other currently available PDA-type products include EO's 440 Personal Communicator, Dauphin Technology, Inc.'s DTR 1, Fujitsu Personal Systems, Inc.'s 325Point, AST Research, Inc.'s GRiD PalmPAD, Sharp Electronics Corp.'s OZ/IQ 9000 and Tandy Corp.'s Z-PDA.

There are two basic problems with trying to connect PDAs to other systems. The first is what technologies to use given the constraints of the size and the second is how to use technologies given the mobility of PDAs.

In an office, PDAs may be attached to docking stations, hardwired to networks, wired to companion desktops that act as a backup or connection device to other resources, or connected to modems and printers using serial or parallel connections.

Wireless options are becoming available both inside offices and out in the field.

MANEL KING

For purely local PDA communications, infrared links or various types of low-power radio technologies can be used. Although products based on these technologies are not particularly high-speed — typically under a megabit per second — they are adequate for many basic PDA services.

The Apple Newton MessagePad has a built-in infrared link that can be used to transfer data to other MessagePads or the Sharp OZ/IQ 9000. Many of the PDA-like devices — open-based computers and personal organizers with keyboards — have infrared or wireless subsystems for linking to docking stations.

While these links work, the tools for integrating the data transferred from and creating data for transfer to PDAs do not yet exist. For example, to create a link from a PDA to even the most simple PC database today requires custom integration. Worse still, the full specifications for how some PDAs store data have not been released. This makes integration experimantal at best.

On the wide-area network side, there are at least three types of wireless service that can be used to support PDAs: one-way pager-type communications; data-only; and voice/data. The type of service, data rates available (in some cases as low as 8K bit/sec), the geographic coverage (most are not nationwide yet), and costs will have a major impact on how PDAs can be linked to network resources.

The key vendors today are: Ardis, a joint venture between IBM and Motorola, Inc.; EMBARC Communication Services in Boynton Beach, Fla.; RAM Mobile Data, Inc. inWoodbridge, N.J.; McCaw Cellular Communications in Kirkland, Wash.; SkyTel Corp. in Washington, D.C.; and Mobile Telecommunication Technologies Corp. in Framingham, Mass.

Although there are a number of services, they are currently optimized to support portable computers, and little work has been done to integrate support for PDA systems.

Until field experience is available and the issues of how WAN wireless technologies affect the use of PDAs can be analyzed, it is impossible to say which services will be cost-effective.

The first PDA-specific communications service is the Apple Wireless Messaging Service for Newton MessagePads offered by Apple. This supplies one-way wireless data transmission that transfers about a screen's worth of text per electronic message transferred.

While this is obviously useful, it does not provide the kind of connectivity required for anywhere, anytime communications. To support two-way communications, Apple has released NewtonMail, a complete electronic mail application, which, at present, only works with dial-up connections to Sprint Corp.'s SprintNet data network.

Generally, the faster the link and the greater the geographic coverage, the better. But until carriers can flesh out PDA-specific services and show them to be workable solutions with full-function gateways to the leading E-mail and messaging systems, it will represent another set of integration headaches for users.

NETWORK INTEGRATION

The network integration challenge with PDAs is basically the same old problem managers face whenever new devices need to be connected but with a new twist. The difference is the need to make network access as transparent as possible so the ease of use is maintained. This is not going to happen overnight, and the range of incompatible standards that PDAs use will make the task difficult.

At the heart of problems are what network services PDA operating systems can use and at what level.

GeoWorks, whose operating system, Geos, is used in the Tandy Zoomer and will be used on the soon-to-be-shipped Personal Information Assistant from Sharp, has gained a powerful ally for network support, Novell, Inc.

GeoWorks has licensed Novell's network client software so PDAs can obtain direct and transparent access to NetWare file servers. This is definitely a step in the right direction as far as integration is concerned, but the work is not completed yet, and the limitations are not yet known.

Over time, however, look for it to get easier to use PDAs with WAN services and for local-area network gateway capabilities to be built-in to PDAs.

A new breed of front-end services linking PDAs to a range of networks and resources will also emerge.

The main connection for the majority of roving PDAs to any net service will be through store-and-forward E-mail for the next three or

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And for good reason. What you're probably using now for LAN-to-IBM host connectivity is a confusing, complicated combination of products that just doesn't add up to an efficient, total network solution.

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four years, a limited form of integration.

Besides the integration challenge, network managers will have to fret about security. The primary security issue of PDAs can be summed up as easy to use and easy to lose. Their portability makes it easy for PDAs to be stolen, mislaid or broken.

Theft is going to become a primary concern because without robust security on the PDA, all sorts of sensitive data — such as computer account names, passwords and bank account details — could be revealed.

Mislaid or broken PDAs could also cause major headaches. If a firm's executives are PDA-equipped and rely on them, what will happen if one of them looses their unit before a critical meeting? Replacing and rebuilding their PDA information could be a nightmare.

The vendors of PDAs are addressing this issue, but it will be a while before field experience reveals the true risks. If your organization is going to attempt any major use of PDAs, there will be significant work to establish secure operations.

It will take a strong third-party market to provide the range of security tools that will be needed. Again, look for it to take three to four years for solutions to arise. Until then, the security problems will belong to you.

SIGNIFICANT TRENDS

Portable computing, in general, is becoming a major development area for all vendors of net systems. Novell is designing client software and NetWare server extensions to give portable computer users, including PDA users, full and secure access. This is to include file, print, database, imaging and telephony services.

Most importantly, Novell is working with Apple, Intel Corp., IBM, Compaq Computer Corp. and Hewlett-Packard Co., Ardis, RAM Mobile Data, Ameritech and Pacific Bell to develop the framework for the kinds of facilities that will make PDA access to nets effective.

Novell is also planning to accommodate Apple's Newton MessagePad through the DataClub software it gained when International Business Software, Ltd. was acquired. DataClub provides peer-to-peer network services for Macintoshes and will be extended to other platforms.

There are many other indications of vendor interest in PDAs. Intel and Microsoft Corp. are developing a new PDA operating system and chipset called WinPad, and Microsoft is further hedging its bets by developing a variant of Windows called Mobile Windows for PDA-type devices.

Compaq has announced that it will develop a PDA called the Mobile Companion based on the Microsoft/Intel WinPad technology, and IBM is also working on a number of PDA prototypes.

THE FUTURE

PDAs are a powerful concept. At present, they are still experimental and too underdeveloped to be relied on in the way we rely on portable computers.

They do not offer fully developed PDA-oriented operating systems, robust handwriting recognition or well-developed communications to make them practical in the true sense of being a personal digital assistant.

In the next couple of years, PDA products will mature. The next generation will offer real PDA services with full-fledged general-purpose computing. Users will be in heaven.

In the interim, PDAs will present many network managers with novel opportunities and new problems to solve. Selecting communications services, integrating the mobile PDAs with corporate network facilities, managing a highly mobile installed base, and controlling and monitoring security could be hellish. Now is the time to assess and test before you start to feel the heat.

➾ Gibbs is a writer, analyst and consultant based in Ventura, Calif. As a contributing editor to Patricia Seybold Group, Inc. (800-826-2424), he authored the research paper "Pen-Based Computing: A New Business Edge." He can be contacted at (805) 647-2307 or on the Internet at mgibbs@rain.org.

Speeds

Continued from page L1

also ship in the second half.

The company intends to license RunWay technology to bridge, router, switch and hub manufacturers so that they can include RunWay networking modules in hardware products.

John Nisson, general manager at Banta Digital Services, Inc., has installed RunWay for Macintosh on seven machines located in the firm's Needham, Mass.-based headquarters.

Banta Digital Services has only had the beta version up and running for a week and has not yet completed all testing, but Nisson said he was impressed with a test involving a prebeta version of the software. Nisson said the demonstration involved transfering a 26M-byte file between two Macintosh machines, once with RunWay and once without it. Without the software, the process took 3 minutes and 13 seconds, and with the software, it took 34 seconds, he added.

RunWay for Macintosh is priced at $395 per machine.

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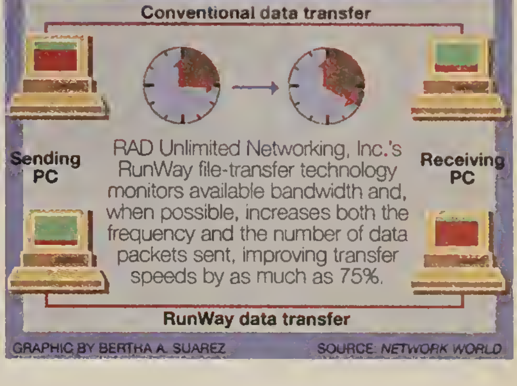
RunWay accelerates LAN-based file transfer



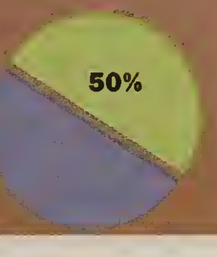
RAD Unlimited Networking, Inc.'s RunWay file-transfer technology monitors available bandwidth and, when possible, increases both the frequency and the number of data packets sent, improving transfer speeds by as much as 75%.

GRAPHIC BY BERTHA A. SUAREZ SOURCE: *NETWORK WORLD*

Switches

Continued from page L1

Based on approximately $30 million in sales this year, Synernetics, Inc. will likely garner about 50% of the Ethernet switch market in 1993, according to Dataquest, Inc., a market research firm in San Jose, Calif.



Pricing for the 6004, which is available now, starts at $16,000, which includes the four-slot chassis, the LANplex Management Module, and the software needed for intranetwork routing and SNMP-based management functions.

Ethernet Switching Modules with eight ports are priced from $12,500, while FDDI Concentration Modules with six fiber or 12 unshielded twisted-pair wiring connections are priced from $8,500. Switched FDDI modules and ATM interface modules will be introduced in 1994.

HP is also concentrating on the switched Ethernet work group market. The new HP EtherTwist LAN Switch is a six-port device codeveloped by HP and Kalpana, Inc. The product leverages Kalpana's cut-through Ethernet switching technology and HP's expertise in the stackable hub field.

Under Kalpana's switching scheme, each port is equipped with an Ethernet packet processor that is connected to a cross-point switch matrix in the hub. As soon as an incoming packet hits the port processor, its address header is read and the entire packet is automatically switched to the appropriate destination port, with an average latency of only 40 microsec.

While this approach provides faster switching rates than competing devices that embrace a store-and-forward switching method, the trade-off is a potential to forward bad or corrupt packets onto the net. But Felipe Ortega, an HP product manager, said the risk of bad packets is small in a work group environment.

"Since the majority of traffic in a small, high-performance work group stays local; the incidence of bad packets is very low," he said. "Corrupt packets become more of an issue in enterprise environments, where a lot of traffic from various sources is crossing the net."

The LAN Switch can support as many as three dedicated 10M bit/sec conversations simultaneously for an aggregate throughput of 30M bit/sec. Each port can also be configured as a full-duplex Ethernet port, meaning the port can send and receive data at 10M bit/sec concurrently.

That capability can be used, for example, to connect one LAN Switch to another, providing more efficient transfer of traffic between them. LAN Switches can also be linked through a BNC or coaxial cable port located on the rear panel of the device.

The LAN Switch supports the Simple Network Management Protocol and can be controlled by any SNMP-based third-party net management system, including HP's OpenView and SunConnect's SunNet Manager.

Available now, the LAN Switch costs $4,200.

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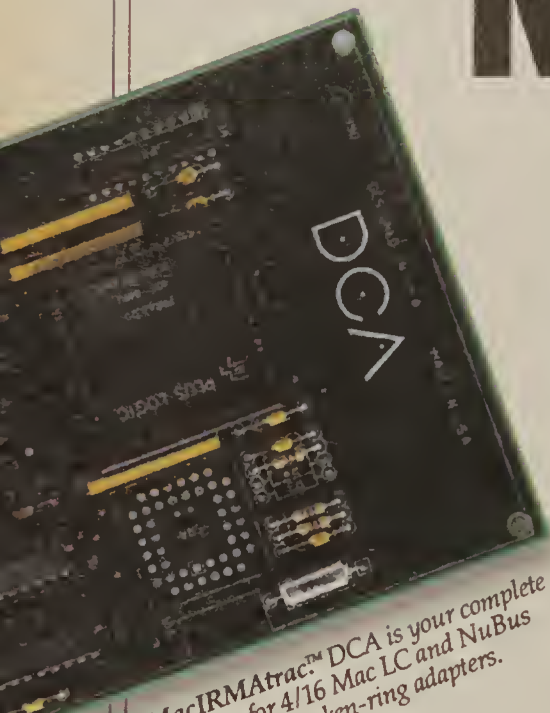

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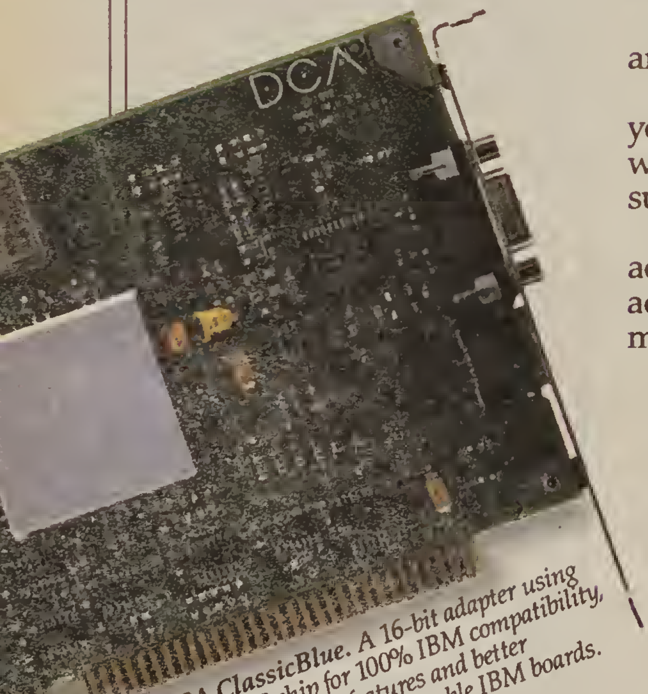

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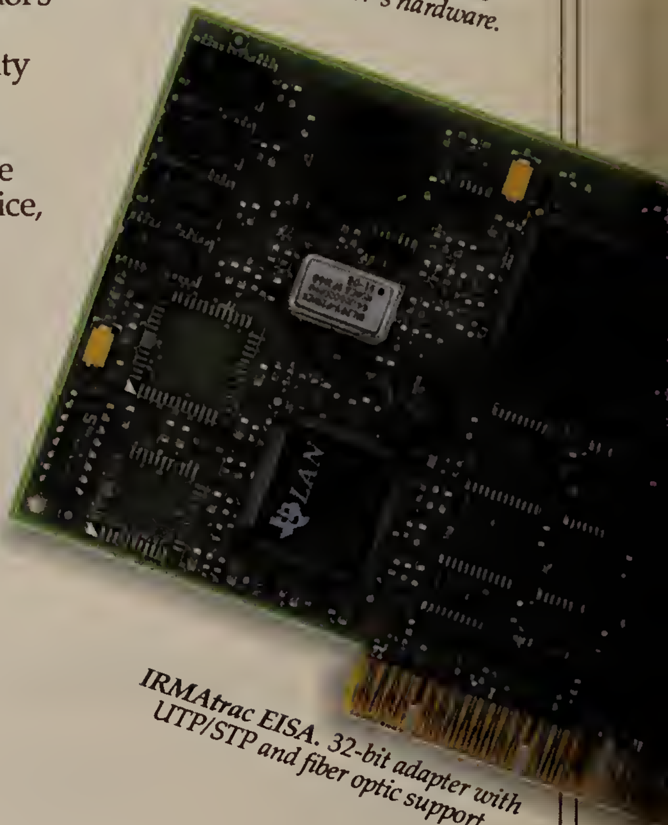

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Circle Reader Service #7

NET RESULTS

by Mark Gibbs

Papering over the cracks

When you start building networks, inevitably you hit the problem of trying to get all the pieces from all the various manufacturers working together, and the call goes out for someone called a systems integrator.

Systems integrators are supposed to do more than just get the network up and running. Their goal should be to get all the parts of the network and computing resources working together seamlessly. In short, to integrate.

So doesn't it seem a shame that so much expectation rides on people who aren't in a position to deliver?

In reality, what systems integrators are being asked to do is make a load of unrelated components fly in formation as closely as possible. The task is not to fill in the crack; it's to just paper over them.

The results of this papering over are threefold. The most obvious problem is that the resulting systems don't tolerate errors and failures with any grace. That is, they crash rather than handle the condition.

The second problem is the systems tend to be hard to use as the papering doesn't quite cover the cracks.

And finally, the nets are hard to modify or extend without starting from scratch.

I could go on at length about the kinds of holes that systems integrators fail to fill when they do an integration project, but I shall refrain for two reasons.

The first is that the tools and techniques that integrators really require have hardly been thought about by many vendors. This makes it hard to really integrate systems at more than a trivial level (and explains why the third-party utilities market is so large).

The second reason is that the clients of the systems integrators usually don't want to spend enough to achieve full, transparent, robust integration. This is not completely unreasonable as the costs can be significant due to the weak architectures of many products.

Industrial-strength systems integration should give us complete connectivity and interoperation of all parts of an organization's information technology resources.

But all that systems integrators are usually asked or expected to do is get the basics working well enough so we can use them to get some work done. Then we complain because the results are unreliable or clumsy.

We simply cannot afford to keep papering over the cracks. We seem to think that because the cracks are covered they aren't a problem. We don't recognize that what we've done is really a quick tactical fix and that we have a strategic requirement...hell no, a strategic responsibility, to fill those cracks in properly.

Where many companies make a further mistake is in assuming that the information technology group can supply limitless quantities of technical support to make up for the poorly covered cracks.

But technical support is often a poorly funded service with limited bandwidth.

What we have here is a collision of several problems. The first is the lack of adequate systems integration tools. Vendors aren't pressured enough to deliver open systems that are suitable for real systems integration.

Second, systems integrators aren't paid enough to do the necessary job.

We force them into bidding the lowest possible price for a job that is inadequately specified because we try to save a few dollars up front and ignore the long-term support and repair costs.

Third, we assume that technical support services can identify and solve any problem. If you're lucky and have talented support engineers, that may be the case. But put those guys in the usual overworked, high-pressure environment and they're going to start papering over the paper that is already covering the cracks. There simply won't be time to do anything else.

The solution? Get realistic about systems integration.

Whether you're installing a new system or expanding an existing one, allocate enough funds to do the best integration job possible. Ensure that the products you will be using actually can be integrated.

➠ Gibbs is a consultant and writer based in Ventura, Calif. Contact him at (805) 647-2307 or on the Internet as mgibbs@rain.org.

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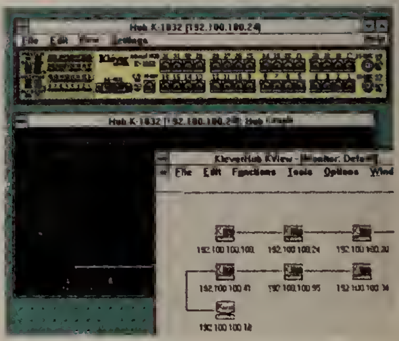
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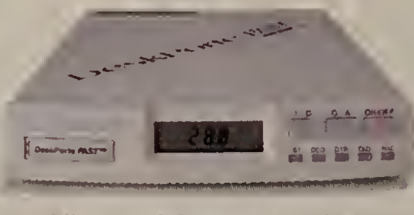
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Circle Reader Service #19

GLOBAL SERVICES

Voice, Data and Wireless Services, Regulatory Issues and Voice CPE

Engineer claims Bellcore fixed ISDN specs

BY BILL BURCH

Washington, D.C.

An ex-Bell Communications Research engineer has detailed to a federal court his allegations that Bellcore sought to rig ISDN specifications to favor particular manufacturers and secure monopoly control of services for the regional Bell holding companies.

Richard Taylor, an engineer who helped write many of Bellcore's key Integrated Services Digital Network documents, last month filed written depositions with U.S. District Court Judge Harold Greene that offer a detailed history of alleged Bellcore misdeeds. In October, Greene ordered the Department of Justice to investigate the charges, which Taylor originally made more than a year ago.

Bellcore declined comment on Taylor's new allegations but in the past has vehemently denied his charges and pledged cooperation with the department in its investigation (*NW*, Oct. 25, page 6).

In a sworn statement filed last month, Taylor describes how Bellcore repeatedly violated anti-

See Specs, *page 22*

A former employee has accused Bellcore of:

- Attempting to rig standards to secure the ISDN services market for the RBHCs.
- Colluding with certain hardware vendors to rig switch and customer premises equipment specifications in their favor.

FCC getting tough on toll fraud

Proposes limits on user liability and equipment guidelines.

BY ELLEN MESSMER

Washington, D.C.

Declaring war on toll fraud, the Federal Communications Commission is now floating the idea of making carriers, rather than their customers, liable for losses due to fraudulent use of phone service.

Although the FCC has no legal mandate to prosecute telephone-related fraud, the commission has decided it should take action to combat a problem said to cost industry as much as $5 billion a year. The FCC wants to set new rules that limit customer liability for fraud and establish new equipment standards, making private branch exchange and mobile equipment more secure.

Comments on the ideas now in play are due in mid-January, when users and vendors will get a chance to tell the FCC their side of the story. But if the past is any guide to the future, users are certain to ask the commision to press both carriers and equipment vendors for greater protection from the criminal activity draining their pocketbooks.

The criminal mind seems to have no boundaries when it comes to finding ways to hack remote access features on PBXs, steal calling cards and illegally use cellular phones.

According to the Notice of Proposed Rulemaking (NPRM) launching the FCC's antifraud initiative, there are three major types of cellular fraud.

To address cellular fraud, the FCC would set new technical specifications, including designing cellular phones so any attempt to remove or tamper with its electronic serial number would render the mobile transmitter inoperative.

The FCC also wants to find a way to balance responsibility among users, carriers and equipment suppliers for preventing all telephone fraud. The commision is interested in finding out what fraud-prevention measures users, carriers and equipment manufacturers should take to head off fraud — and what constitutes a failure to take those responsibilities.

The FCC is inclined to limit customer liability for losses, thereby shifting the weight of fraud prevention to carriers and equipment vendors. The Truth in Lending Act limits user liability for calling cards to $50.00; the FCC is considering a similar, but broader rule covering other toll fraud losses.

Carrier tariffs that limit carrier liability for losses due to fraud will be closely scrutinized under the proposed rules. "I believe tariff provisions that limit carrier liability and do not warn customers of fraud risks may be unreasonable and counterproductive from the standpoint of effective response to fraud," Commissioner Andrew Barrett said.

But at the same time, the commisioner acknowledged that balancing blame is difficult.

In one case resolved last August, the FCC found that New York Telephone Co. acted unlawfully in attempting to collect charges from United Artists Payphone Corp. for unauthorized interstate and international calls made from its payphones but accepted or completed through New York Telephone and AT&T networks.

But that same week the FCC turned down Chartways Technologies, Inc.'s request to rule that AT&T was liable for

See Fraud, *page 22*

IT'S WAR!

FCC proposes new rules to combat toll fraud.

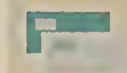
Payphone fraud

Payphone providers taking reasonable steps to limit their exposure to toll fraud should not be required to pay bills generated as a result of fraud.

Cellular fraud

- Establish technical specifications for mobile equipment to prevent tampering with the electronic serial number.
- Examine whether there is adequate incentive for industry to address fraud prevention in customer premises equipment.

Calling card fraud



- Require long-distance carriers to provide data that enables local exchange carriers to develop calling pattern profiles.
- Establish a rule for allocating liability for toll losses.

Equipment

- Require manufacturers to provide toll fraud risk warnings and information on how to limit financial exposure.
- Require PBX manufacturers to explain risk of using equipment without modifying default codes.

SOURCE: FEDERAL COMMUNICATIONS COMMISSION, WASHINGTON, D.C.
GRAPHIC BY TERRI MITCHELL

PacBell plans custom net service

BY BILL BURCH

San Francisco

Pacific Bell is gearing up to offer a virtual private network service at the end of next year that will give Californians new flexibility in handling local and long-distance connections.

In addition to allowing users to set up virtual private networks within the state, Pacific Bell's Custom Virtual Network service will let them distribute long-distance traffic among multiple carriers, according to Richard Chin, project manager for the service.

"If [customers] wanted to use MCI during the day, AT&T during the evenings, and Sprint on the weekends, Custom Virtual Network allows them to do that," Chin said. Other custom network deals don't offer similar flexibility, he said. "The interexchange carriers might not be as eager to send their traffic to their competitors."

Pacific Bell is currently conducting its first technical trial of the service, testing voice connections for the state of California. The carrier plans to support data services as well by the time the service becomes generally available, Chin said.

Pacific Bell has not yet figured out exact pricing for the service, but said it would be on par with the cost of running private networks and would include tariffed rates with term and volume discounts. Pacific Bell will also continue to offer custom network deals on an individual case basis, Chin said.

The first customer for the service, at least, is realizing signficant savings.

The state of California has a private network that provides long-distance voice and data services connecting state, county and local governments sites, according to Allan Tolman, chief of telephone and network services with the state's telecommunications division. For local service off the backbone, the state had been paying 10.4 cents per minute to Pacific Bell, which provides the 85% of the state's local coverage. With its Custom Virtual Network deal, the state negotiated a rate of about 2 cents per minute for its local service, according to Chin.

Such statewide virtual private networks with discounted local rates are expected to appeal to retail chains, financial services organizations, health care providers and universities, Chin said.

With those audiences in mind, Pacific Bell is considering two pricing plans. One plan would be built around public-sector customers that do a lot of local calling, while the other would target national accounts that mix local and long-distance calling.

✆Pacific Bell: (510) 823-2958.

BRIEFS

France Telecom and **Deutsche Bundespost Telekom** last week announced an alliance under which they will create a joint venture company to provide business services including X.25, switched data, frame relay and Internet Protocol routing.

Under the Memorandum of Understanding signed last week in Brussels, Belgium, the carriers will combine assets from their European subsidiaries to make the joint venture operational in 1994, with an expected 4,000 employees.

The new venture, headquartered in Brussels, will provide one-stop shopping and centralized billing for business customers in France and Germany. Although **AT&T** was expected to join the venture, last week the carrier said it is not part of it at this time. AT&T said it still plans to offer similar services in Europe under its **WorldSource** partnership.

The merging of the telephone and cable television industries continued last week as **Southwestern Bell Corp.** announced plans to invest $1.6 billion into a joint venture that will take over most of **Cox Cable Communications'** CATV systems.

SBC CableComms — valued at $4.9 billion — will operate 21 CATV systems with 1.62 million users.

Cox Cable starts out as majority owner of the new partnership with 60% of the company, although Southwestern will have an option to increase its share to 50% within three years.

Each of the two companies will get two seats on the new company's board; Cox Cable President James Robbins will be the joint venture's chief executive officer. The two companies expect to come to terms in the first quarter of next year; the partnership will be formed by the third quarter.

Specs

Continued from page 21

trust laws and the Consent Decree by doctoring ISDN specifications. Bellcore wanted to conceal nonstandard details within its ISDN specifications in order to ensure RBHC control of network connections and ISDN signaling, as well as restrict the customer premises devices that could use ISDN, Taylor said.

Taylor's previous allegations against Bellcore met with industry scepticism due to the public nature of the ISDN standards process.

But the engineer's latest statement portrays Bellcore making the changes unilaterally, then seeking approval of its RBHC sponsors. In particular, Bellcore tried to secure control of ISDN D-channel signaling for the RBHCs, he said.

Taylor was a Bellcore employee from 1985 until 1991 and worked on ISDN signaling, services and equipment specifications for the consortium. From January 1987 through September 1988, Taylor said he performed work for Bellcore that violated the Consent Decree. In January 1988, Taylor said he began to refuse work that would violate the terms of the Consent Decree or antitrust laws. Bellcore fired Taylor in March 1991.

During 1987 and 1988, Bellcore sought to restrict the range and type of devices that would work with ISDN switches in the local exchange to control the customer premises equipment market, Taylor said. The research consortium got written approval for the strategy from the RBHCs around September 1988.

Bellcore's stake in the equipment market is unclear. Barred from manufacturing equipment by the Consent Decree, the RBHCs would appear to have no incentive to control either the switching or customer premises equipment markets.

However, Taylor twice hints at collusion between Bellcore and unnamed manufacturers. For customer premises equipment, Taylor said an ISDN terminal design he wrote for Bellcore copied an existing vendor's product. That specification was later suppressed, he said.

For the ISDN switching market, Taylor wrote a document comparing AT&T's 5ESS and 5E6 switches to Bellcore technical requirements for basic rate ISDN. While he was working on the document, Bellcore attempted to influence Taylor's analysis to reach a conclusion favorable to particular vendors, he said.

Taylor said Bellcore also sought to influence his work on a congestion control scheme to favor a particular vendor and discriminate against a second one. Taylor did not name the particular vendors involved in the switching or customer premises equipment documents and has referred inquiries to his lawyer, Linda Kenney, who has not returned calls.

When the National ISDN 1 standard was first settled on, AT&T's equipment met the standard, but rival Northern Telecom, Inc.'s gear was unable to support some of its advanced functions, said Lee Greathouse, a telecommunications consultant in Alexandria, Va. ANSI subsequently dropped some of those functions so the Northern Telecom switch could meet the standard, Greathouse said.

Between them, AT&T and Northern Telecom control the majority of the U.S. central office digital switching market. AT&T is projected to have 50% of the market this year, with Northern Telecom holding 33%, according to Northern Business Information. AT&T spokesman Carl Blesch said the firm is not in a position to comment on Taylor's allegation but hopes there will be a thorough investigation.

Northern Telecom says it's been satisfied with Bellcore's work on the ISDN standards. "We've always found Bellcore to be very professional and even-handed throughout our relationship with the organization," said Mark Dill, a Northern Telecom spokesman. "Bellcore has been instrumental in ensuring that our perspective has been introduced into all the discussions on standards." ☒

Fraud

Continued from page 21

unauthorized calls placed through the Chartways' PBX. In that case, which originated several years back, Chartways balked at paying AT&T thousands of dollars for the large volume of unauthorized calls made to Pakistan through the Chartways PBX, but the FCC ruled AT&T could not be held responsible for the losses.

These cases, as well as a petition from Pacific Mutual Life Insurance Co. asking the commision to set policies associated with PBX fraud, have set a fire under the FCC to identify what steps it can take to help reduce the risks of toll fraud.

There is no specific federal legislation regarding toll fraud, and the Secret Service estimates that as few as 13 states have enacted statues specifically dealing with telephone crimes.

The FCC is asking for public input on whether legislation is needed to fight toll fraud, and what it should do to combat a crime in which criminals are rarely caught and prosecuted. ☒

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Circle Reader Service #27

Wireless Datacomm attracts small group of brave souls

BY ELLEN MESSMER

Washington, D.C.

The Wireless Datacomm 93 show here didn't draw a huge crowd, but it attracted the pioneer element.

Several vendors, including Bell Atlantic Corp., SkyTel Corp., WordPerfect Corp. and Lotus Development Corp., introduced new services and products geared toward tetherless data. And amid the vendor hubbub, the General Services Administration made clear that it is ready to leap into the wireless fray and plans to contract for RAM Mobile Data, Inc. packet data services the end of the year.

Bell Atlantic Mobile announced AirBridge, the brand name it will use for its wireless data services.

SCOTT

"We intend to treat circuit-switched data as a separate service from voice cellular," said Benjamin Scott, executive vice president and chief executive officer of Bell Atlantic Mobile. The company, ready to outfit users with cellular adapter cables and modems, said it will offer custom pricing on circuit-switched data but declined to provide further pricing details.

Bell Atlantic Mobile also unveiled a gateway service whereby the Microcom Network Protocol 10 cellular modem protocol can be converted into a wide range of land-line protocols.

For a flat charge of $2.95 per month — which will only be charged to the user's bill when the service is actually used — the cellular user can dial into the gateway and complete a data call without having to worry about what protocol is used by the modem on the receiving end.

Bell Atlantic Mobile also activated its first Cellular Digital Packet Data sites last week and plans to start providing the 19.2K bit/sec service in the Baltimore and Washington areas early next year. "We haven't yet decided whether to have per-packet or general access pricing," Scott said.

Other companies making announcements included SkyTel, which said it now provides access to both the Internet and the General Electric Information Services value-added network. That will let users receive electronic mail messages from either network over SkyTel's nationwide paging network.

Amid the vendor hubbub, the General Services Administration made clear that it plans to leap into the wireless fray.

WordPerfect offered up a version of WordPerfect 4.0 called WordPerfect Office Remote, which will let users send messages over the RAM Mobile Data network using the AT-compatible Intel Corp. wireless modem (*NW*, Dec. 6, page 70).

Appearing on a panel discussion at the Wireless Datacomm show, Glen Kaufman, Lotus' business development manager, hinted that next year the company will provide a wireless version of cc:Mail and Notes tailored to work over a new personal digital assistant (PDA) from an unnamed equipment vendor.

"We can't yet do this for all PDAs," Kaufman said. "It requires a complete rewriting of the operating system," an expensive and time-consuming affair.

Amid the vendors hawking their wares, users appeared in small numbers to scout the new terrain.

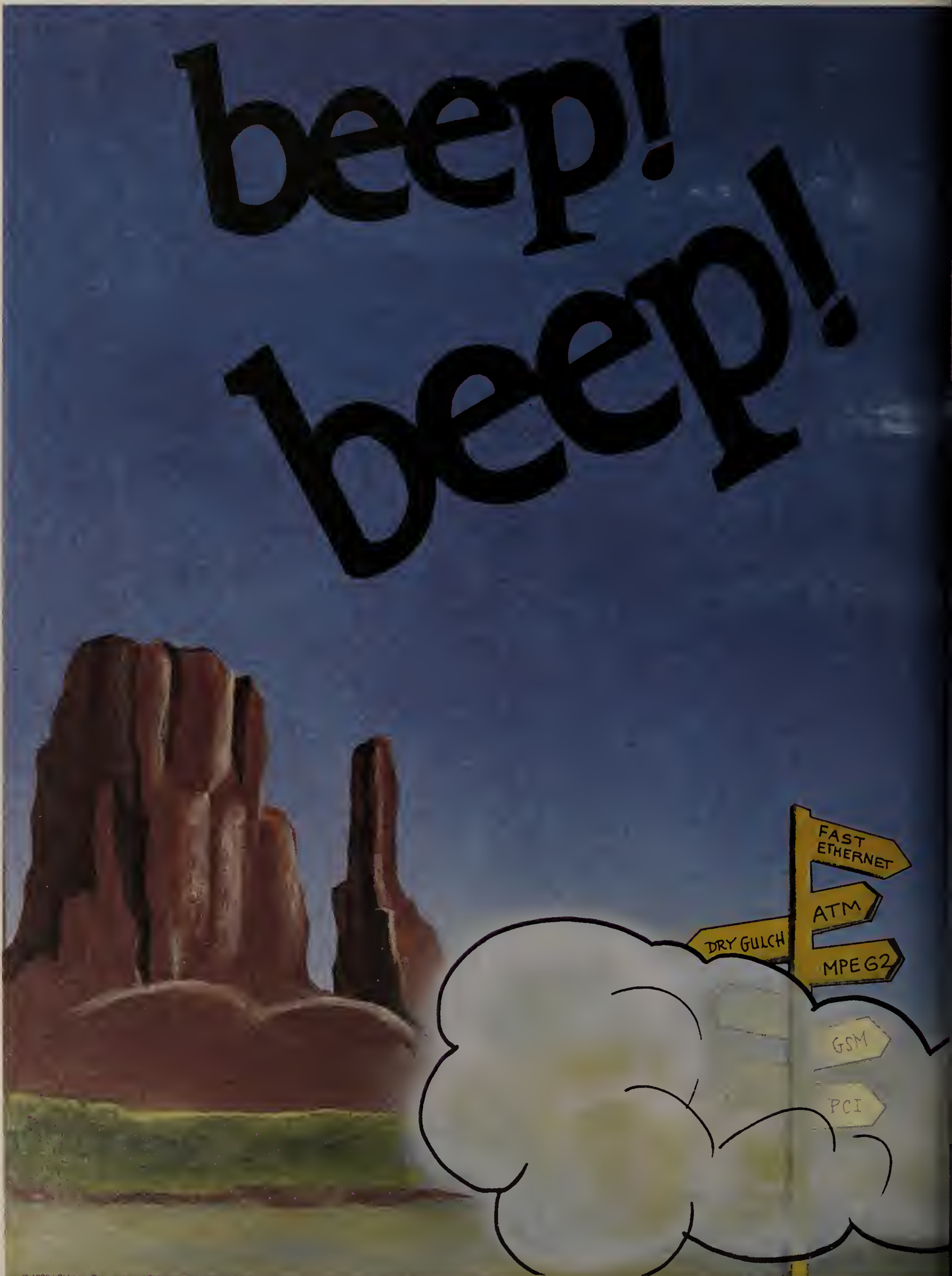
GSA Communications Chief Bill Horst said about a dozen users at GSA's Philadelphia division have been testing a version of cc:Mail for MS-DOS-based laptops and a Hewlett-Packard Co. palmtop to send and receive messages over RAM Mobile Data's wireless data network.

"The speeds aren't blinding, but it gets the mail back to the local-area network," Horst said.

GSA is now using an Intel modem as a single-line gateway to bring RAM Mobile Data-based messages into the GSA LAN internet. But the GSA expects to soon finalize a more widespread contract with RAM Mobile Data by year end.

At that time, the agency will move to a larger gateway system and use the Windows-based version of cc:Mail for RAM Mobile Data now under beta test.

"The goal is to get a procurement done by year end for the Philadephia zone, which also includes New York, Boston and Norfolk, Va.," Horst said. Z



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Da Vinci

Continued from page 8

"It's clear to us that there are tremendous advantages of developing eMail as an NLM. It's technologically and economically desirable," Rainey said.

This week's licensing agreement is part of a broader Strategic Development Agreement between Novell and Da Vinci signed in February of this year under which the two companies agreed to work on compatibility and integration between their products.

But Rick Bohdanowicz, director of marketing for NetWare Services at Novell, stressed that the agreement is not exclusive.

"There are about 150 other companies that offer MHS-based applications and utilitites, eight or nine of which are in the E-mail business," he said. "It's certainly conceivable that other vendors would be interested in this type of agreement."

PUNDITS SOUND OFF

Industry reaction to the licensing agreement and the pending NLM was mixed. Mark Gibbs, a consultant and writer based in Ventura, Calif., said the packaging of Da Vinci eMail in a Novell box is akin to the U.S. government endorsing Ford autombiles.

"This means Da Vinci appears in a more preferable position than anybody else, like Beyond [Inc.] or Reach [Software Corp.]," he said.

"It's been hard enough for these other companies to make a name for themselves. This will make it even harder."

But others were less enthusiastic.

"Most users don't even know what Da Vinci does," said Tom Nolle, president of CIMI Corp., a consultancy based in Vorhees, N.J. "If they'd made this agreement with Da Vinci a year and a half ago, it would have made a lot more sense. But at this point, most people have already bought their mail packages — it's too late."

Even users that haven't settled on an E-mail package were unphased.

"We have no E-mail in place. We're researching it right now," said Chuck Rush, manager of network computing at McDonalds Corp., based in Oakbrook, Ill. "Even so, Da Vinci's not on our list. We have more than just NetWare, so we're looking for a global E-mail solution."

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LSI LOGIC

Duo

Continued from page 8

oped by the hub maker. Since both ends of the fast Ethernet connection will be based on Fast Frame and the 802.3 standard, the companies are promising the products will be interoperable.

The SynOptics products will be available around the same time as the Intel NICs. Pricing for all the products will be announced then, but the companies indicated the price range would be approximately two times that of current 10M bit/sec offerings.

"In order for a new technology to fly, users must be convinced that different products can work with each other," said Rod Stuhlmuller, business alliance manager at SynOptics. "We will guarantee that compatibility through standards adherence as well as extensive interoperability tests."

The announcement comes on the heels of a similar move by 3Com Corp. and AT&T Microelectronics to codevelop a processor for the physical media-dependent layer of the 100Base-T standard (*NW*, Nov. 8, page 6). That chip will be used in NICs and wiring hubs, as well, with availability also in the mid-1994 range.

SynOptics' buddies

In addition to Intel Corp., SynOptics has joint development or OEM deals with:

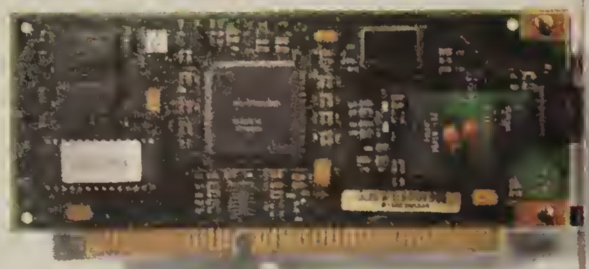
- Cisco Systems, Inc.
- Hewlett-Packard Co.
- IBM
- Kalpana, Inc.
- NetLabs, Inc.
- Network Peripherals, Inc.
- Novell, Inc.
- Retix
- SunConnect
- Xylogics, Inc.
- Xyplex, Inc.

SOURCE: SYNOPTICS COMMUNICATIONS, INC., SANTA CLARA, CALIF.
GRAPHIC BY TERRI MITCHELL

According to Kathryn Korostoff, principal of Sage Network Research, a market research firm in Newton, Mass., joint ventures such as the Intel-SynOptics and AT&T Microelectronics-3Com deals mean users will have a range of standards-based, competitively priced products available to them.

"These announcements mean end users have no reason to wait for uncertain standards to develop in other technology areas if they have high-speed network requirements now," she said. "The fact these vendors are teaming to provide interoperable products also validates research we've done recently that indicates fast Ethernet is the high-speed LAN of choice for users evaluating higher speed network options."

☎Intel: (408) 765-8080; SynOptics: (408) 988-2400.



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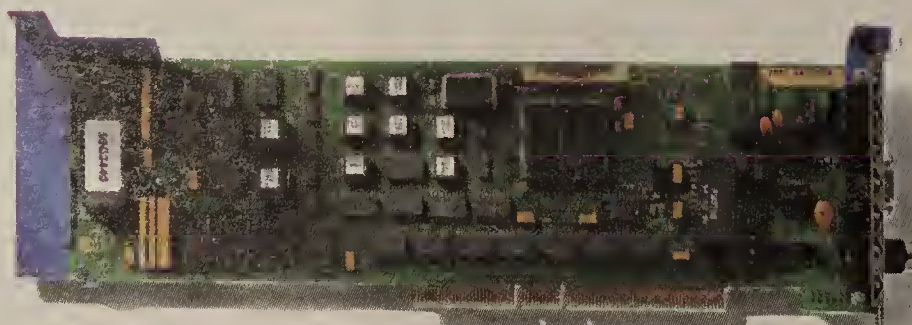
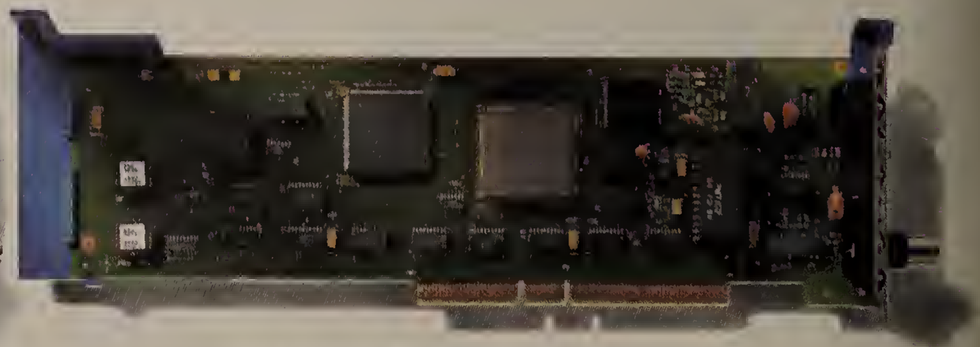


LAN Adapter/A for Ethernet (10BaseT/2/5, MCA)



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RATE & TARIFF MONITOR

by David Rohde

Deciphering frame relay rates

State regulatory approval has given the GTE telephone companies their first two beachheads in frame relay service — Florida and Washington — and the nation's biggest independent operating company plans to roll out the service to at least seven other states during the next year. The GTE frame relay tariffs differ in some aspects from many of the recently filed Bell operating company offerings.

Consider the filing of GTE Florida, Inc., which took effect Oct. 19. It lists three explicit rate elements instead of the two found in many BOC frame relay tariffs, although that doesn't mean the overall price is higher:

- The frame relay access line is the connection from the customer premise. The choices are 56K or 1.544M bit/sec T-1. At 56K bit/sec, the nonrecurring charge is $340 and the monthly rate is $49. For T-1, the nonrecurring charge is $693 and the monthly fee is $176.
- There's a separate charge for the frame relay port, where access lines are connected to the carrier's frame relay switch. For 56K bit/sec, the price is $50 initially plus $50 per month. For T-1, the price is $50 initially plus $400 per month.
- Finally, there's a charge for the permanent virtual circuits (PVC). You get one free PVC per port, but that's usually not enough, since most users want to create meshed networks. Additional PVCs cost $20 apiece plus a monthly charge ranging from $3 to $5 each, depending on how many you have.

Compare this pricing to some BOC frame relay tariffs: The Chesapeake and Potomac Telephone Co. (C&P) of Virginia, Southwestern Bell of Texas, and New York Telephone Co.

C&P carries only two rate elements: the access line and PVCs. But the port charges are bundled into the access lines, and the installation charges are fairly steep — $800 for 56K bit/sec and $1,000 for T-1. And the 56K bit/sec access line monthly charge is $175 — compared with the total $99 for the combined access and port charges from GTE Florida. Yet look at the C&P prices for additional PVCs beyond the free one with each access line: only $5 plus $1.25 per month.

Southwestern Bell goes in a different direction. The PVC prices are far more expensive: anywhere from $45 to $160 per month each, with initial nonrecurring charges of $120 to $150 each. And the charges for the access lines run $170 to $850 per month. (Southwestern Bell does charge less when frame relay is used to link customers with long-distance carriers.)

By contrast, New York Telephone's PVCs can be had for peanuts. The first four cost $10 per month apiece, the next five $5 apiece, and each additional one a buck every month. Port connections are a separate charge, as they are with GTE Florida, but they cost more: from $67 per month for 56K bit/sec to $985 for a T-1. And the charges for the access lines aren't even in the frame relay section — New York Telephone refers you to its private-line pricing.

Also, C&P's tariff provides the ability to choose a committed information rate (CIR) on your PVCs to prevent packet data discard due to network congestion. For example: If you want to be assured that a PVC attached to a T-1 frame relay access line gets 256K bit/sec throughput, you pay C&P $9 more per month for that logical link. New York Telephone will likewise soon list CIRs in its pricing.

Most other BOCs simply let you pump data across your PVCs at rates up to your access port speed, although there's no guarantee you'll always be able to send data at that full speed.

Additionally, make sure you know whether any sliding scale for added PVCs is cumulative. GTE Florida gives you the full benefit of a bulk purchase: Once you reach 20 logical links, each one — not just those over 20 — costs only $3.

Finally, watch out for the word "optional" in these tariffs. New York Telephone's tariff calls additional PVCs an "optional feature." Technically, that's true. But if you only want one PVC per port connection — the free PVC that's mentioned in all of these tariffs — you might be a better candidate for leased lines.

➻ Rohde is associate publisher of the Center for Communications Management Information in Rockville, Md., a provider of rate and tariff information. He can be reached at (301) 816-8950, Ext. 292.

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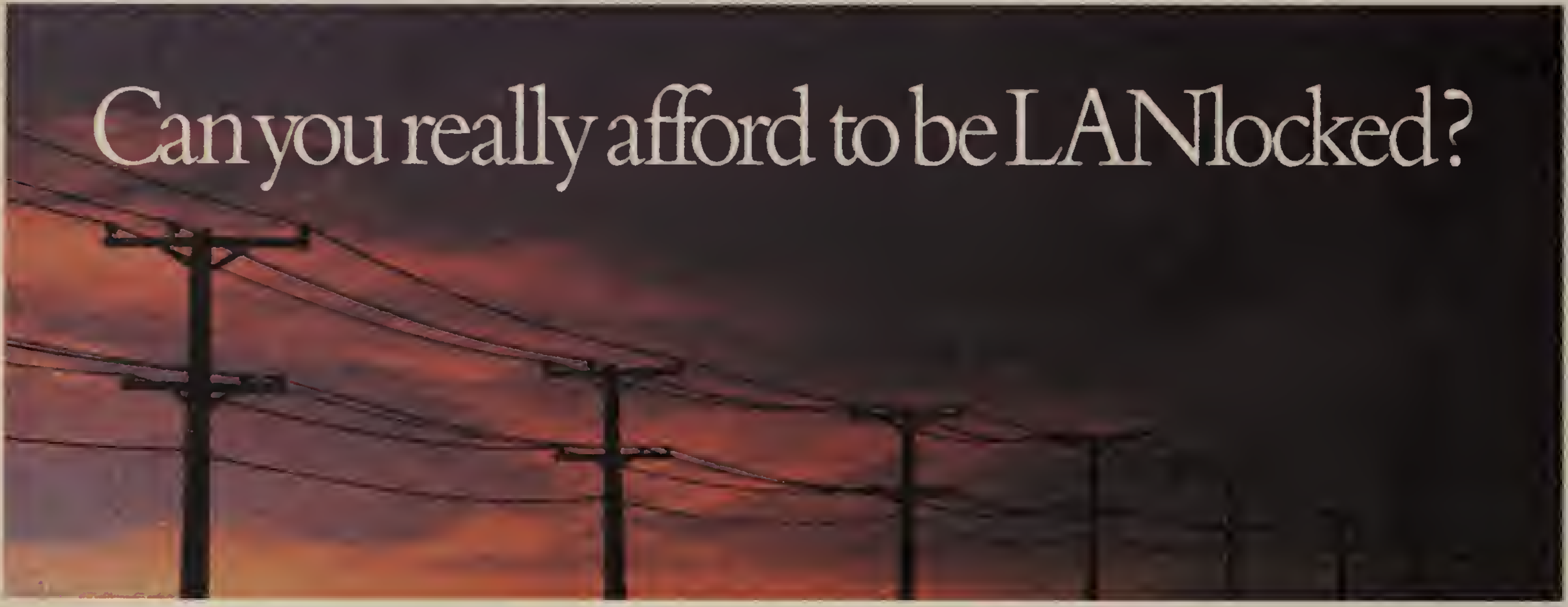

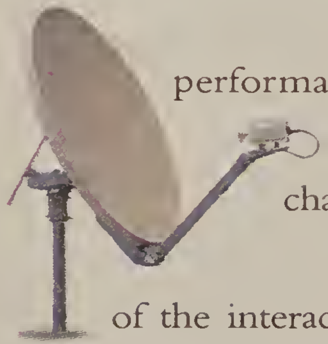

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Circle Reader Service #23

CLIENT/SERVER APPLICATIONS

Distributed Databases, Messaging, Groupware, Imaging and Multimedia

BRIEFS

Wang Laboratories, Inc. last week announced software to integrate its imaging technology with Lotus Development Corp.'s Notes software. Wang said its image developers' kit will allow for applications in which Notes users can display and share images from Wang's Open/Image system. The kit costs $199.

Wang: (508) 459-5000.

Microsoft Corp. has introduced a new version of its Microsoft Mail software development kit. The kit, Version 3.2, adds support for the X.400 Application Program Interface Association's Common Mail Calls for cross-platform application development; a set of 13 sample applications; and software libraries that allow development of applications using Microsoft Mail and Schedule+. The kit carries a suggested retail price of $395.

Microsoft: (216) 882-8080.

Natural Microsystems Corp. (NMS) of Natick, Mass., is working in conjunction with Lotus Development Corp. to offer voice and telephony support for the Lotus Notes work group environment. NMS will provide voice management functions that will allow users to record and play voice files stored in either the adaptive differential pulse code modulation or the. WAV formats used in multimedia personal computers and workstations.

NMS will also supply hardware that will enable Notes third-party vendors to implement call processing systems.

NMS: (508) 650-1300.

Expressway Technologies Corp. in Waltham, Mass., has released the Expressway 101 Decision Support Query Accelerator, a patent-pending SQL product designed to dramatically increase the performance of exisiting decision support applications. Expressway's indexing and algorithms reduce the time needed for index loads and updates, and is specifically tailored for decision support environments.

The product is available for Sun Microsystems, Inc. SPARCstations and Data General Corp. AViiON systems running both Sybase, Inc. or Oracle Corp. databases.

Expressway: (617) 890-8670.

A windows-based integrated development environment for Sybase, Inc. **SQL Server** or Microsoft Corp. SQL Server has been announced by San Francisco-based **Embarcadero Technologies, Inc.**

Rapid SQL 1.0 is a graphical computing environment that allows developers, administrators and users of SQL Server to create and manage database objects. In addition, the product can be used to formulate browse and query databases on multiple SQL Servers. Rapid SQL 1.0 can be used with Sybase SQL Server Version 4.0-4.9, Microsoft SQL Server for NT or OS/2 and the MicroDecisionware Gateway. The program sells for $695 but is available for $495 through Dec. 31. Discounts are available for five and 10-user configurations.

Embarcadero: (415) 434-1721.

SQL Access Group forges ahead with new advisory board, specification

DEUTSCH

"We're very pleased that the CLI has moved to preliminiary status and feel this is a significant step toward assuring users that compliant implementations will be compatible with future SQL standards."

HOLT

"Our work with X/Open is designed to provide users with a standards-based environment that provides broad interoperability, which is critical in today's mixed computing systems."

BY PETER LISKER

Manchester, N.H.

The SQL Access Group (SAG) has announced a preliminary specification for the Call Level Interface (CLI) as well as the formation of an advisory board designed to expand the group's influence and standards-setting ability.

The CLI is a third-generation application program interface (API) that promises vendors building applications increased interoperability with a range of SQL database back ends.

The specification is now in the preliminary stage, meaning it has been deemed technologically stable and ready for use in product development.

SAG, located in Manchester, N.H., uses a three-stage implementation process for standards in the SQL arena. The first stage is a snapshot, designed to enable member organizations to examine a proposed specification and comment on changes they would like to have incorporated.

In the second, or preliminary, stage, the specification is published as a stable technical draft that allows members to begin product development. The final stage presents the specification as an X/Open Company, Ltd. X/Open Portability Guide 3 specification and assures customers that any product adhering to the specification will meet all X/Open requirements for interoperability.

"We're very pleased that the CLI has moved to preliminary status and feel this is a significant step toward assuring users that compliant implementations will be compatible with future SQL standards," said Jon Deutsch, newly elected chairman of the SAG.

Merrill Holt, vice president of SAG, added, "Our work with X/Open is designed to provide users with a standards-based environment that provides broad interoperability, which is critical in today's mixed computing systems."

The CLI specification will support programs written in both COBOL and C, and defines a set of calls for interfacing database applications to SQL-compliant databases. The specification costs $70 and can be ordered from SAG directly. All SQL specifications are also available from X/Open.

SAG also announced the formation of an advisory board to broaden the group's responsiveness to end users. "The advisory board will help our ability to deliver timely and responsive specifications by providing us with an outside source for objective end-user opinions as well as providing some needed guidance on innovative technology developments," Deutsch said.

The advisory board, which comprises database industry analysts, convened for the first time in November. Board members include Colin White, president of Database Associates; Rob Tholomeier, Open Computing and Server Strategies program director for META Group; Sanjeev Varma, director of strategic data management for New Science Associates; Clark Allen, manager of development for the Petrochemical Open Software Corp.; and Jim Johnson, chairman and founder of the Standish Group.

"The SQL Access Group has added significant value to the database market by effectively producing a series of quality product specifications," White said. "The challenge for the group during the coming year will be [to act] as a proactive agent to assist in getting these specifications into the hands of end users and promoting the implementation of compliant products by industry vendors."

©SAG: (603) 434-0802.

SQL Access Group profile

Charter

Founded in 1989, SAG is a consortium of 41 software vendors that is developing standards to ensure interoperability of database products based on SQL. The group works cooperatively with X/Open Company, Ltd.

Members include vendors of database and related tools:

Apple Computer, Inc.
Borland International, Inc.
Computer Associates, Inc.
Digital Equipment Corp.
Gupta Corp.
Information Builders, Inc.
Ingres
Lotus Development Corp.
Novell, Inc.
Oracle Corp.
SAS Institute, Inc.
Sybase, Inc.
Tandem Computers, Inc.
...and others.

GRAPHIC BY BERTHA A. SUAREZ

LOTUSPHERE

Database, work flow apps announced at Notes show

New wares ease work load for developers.

BY ADAM GAFFIN

Orlando, Fla.

Several vendors used last week's first Lotusphere development conference to announce applications that link Lotus Development Corp.'s Notes software to external databases or use Notes as a base for work flow programs.

Action Technologies, Inc., of Alameda, Calf., announced a three-program software suite designed to help developers build work flow applications for Notes users.

Action Workflow System for Notes lets users automatically generate Notes forms and views — essentially, Notes applications — freeing developers from having to write lengthy macros.

Unlike other work flow products, which rely heavily on electronic mail for routing tasks, Action's software uses a database model for processing information, said Bryan Kerr, vice president for sales and marketing. He added, however, that the software lets customers use Notes E-mail to help coordinate their work. The company recently won two patents for its software.

The software products, which run on an OS/2 server, also can be used with the company's Action Workflow System for the Microsoft/Sybase SQL Server, allowing access to non-Notes databases.

The product includes: Analyst, a program that creates graphical views of proposed work flow routes and lists for $495 per copy; Application Builder, which lets developers customize work flow routes and forms, and lists for $1,495 per copy; and

See Database, *page 31*

Sampling of Notes developments from Lotusphere

Action Technologies, Inc.
Action Workflow System for developing work flow applications for Notes. (510) 521-6190.
Revelation Technologies
Working with Lotus Development Corp. to link Notes with Revelation's OpenInsight software for creating on-line transaction processing. (203) 973-1000.
Staffware Corp.
Working with Lotus to use Windows' Dynamic Data Exchange to connect Staffware's work flow automation software with Notes. (617) 239-8221.
Bond Techologies, Inc.
Notrix/E software will let Notes users gain access to SQL databases. (212) 697-4700.

GRAPHIC BY BERTHA A. SUAREZ

MOST ROUTER VENDORS THINK A WAN IS JUST A BIG DARK CLOUD.

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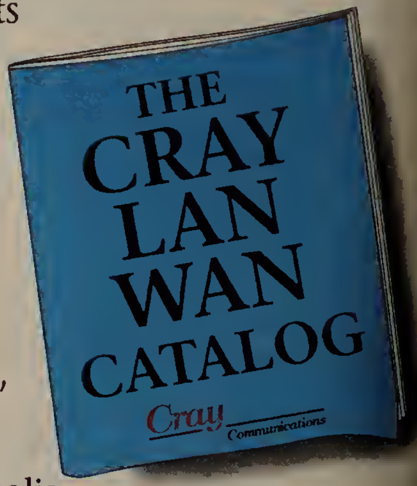

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Circle Reader Service #16

DBMS tools pass updates to warehouse

BY PETER LISKER

Sunnyvale, Calif.

Prism Solutions, Inc. has introduced software modules that allow customers to capture changes made to legacy databases and pass them off to a new version of its Warehouse Manager, Release 3.5.

Prism's new Changed Data Capture modules for IBM IMS and DB2 databases automatically capture changes made to an operational database and generate the COBOL code necessary to update the appropriate fields in data warehouses or operational data stores (ODS).

Both modules work based on the principle of reading the source database management system log tape that is generated whenever a database transaction is made and formatting the relevant records for incoporation into the data warehouse.

"Our customers have a critical need to be able to implement facilities that automatically track DBMS changes and apply them to their underlying data warehouse and ODS environments," said Jim Ashbrook, vice president of marketing for Prism. "With Changed Data Capture, users can now extend data warehousing to include the critical IMS and DB2 systems that are still a fundamental component of many operations."

Data warehousing is increasingly important in today's computing environments and is most typically used to support sophisticated decision support applications that require masses of operational data. Data warehouses provide an integrated, historical information source for managers and users who are making long-term strategic business decisions.

A data warehouse, in the Prism view, is different from an ODS data store because warehouses contain snapshots of summarized historical data spanning long intervals of time, typically years, while ODS stores usually contain only 30 to 60 days worth of data.

Prism's new facilities also let users link both structures in an automated way that minimizes the need for user-written code to handle the management of both environments.

Release 3.5 of Prism's Warehouse Manager uses a menu-driven personal computer interface to map source data to a target DBMS and requires no programming.

The system is capable of extracting data from multiple source environments, including DB2, Digital Equipment Corp. RMS, IBM VSAM files, and sequential files from both IBM MVS and Unix. The target database can then be built for the data warehouse using either DB2 and other database products from Oracle Corp., Sybase, Inc., Tandem Computers, Inc. or Red Brick Systems.

IMS Changed Data Capture is available now, with the DB2 version scheduled to appear in January. Both modules cost $25,000. Prism also announced that versions for IDMS and CICS/VSAM will be available next year. The Prism Warehouse Manager Release 3.5 is priced at $75,000 with January availability.

✆Prism: (408) 481-0240.

Database

Continued from page 29

Manager, a that processes work flow rules and requests, and has a list price of $8,000 for a 10-user license.

PowerSoft Corp. of Burlington, Mass. used Lotusphere to announce that it is beginning to beta-test routine libraries that will let users of its PowerBuilder application development system incorporate Notes databases.

The company says this will allow development of applications that can access both Notes and other databases. No price was announced for the libraries, which are expected to ship in the first quarter of next year.

Revelation Technologies of Stamford, Conn, said it is working with Lotus to link Notes with its OpenInsight software for creating on-line transaction processing applications. Beta testing is expected to begin in the first quarter of 1994.

Revelation adding that it will also begin work on developing messaging tools based on the Vendor Independent Messaging application program interface used by both Notes and Lotus' cc:Mail.

Staffware Corp. of London said it is working with Lotus to use Windows' Dynamic Data Exchange to connect its work flow automation software with Notes. Notes users will be able to start Staffware work flow procedures from within Notes and share common data and messages with Staffware users and programs.

DATABASE ACCESS

Bond Technologies, Inc. of New York said it was beginning beta tests of software, called Notrix/E for Notes, that will allow Notes users to import data from any database supported by Information Builders, Inc. EDA/Server software. These include Oracle, DB2, RMS, VSAM and other databases on Hewlett-Packard Co., IBM and Unix platforms.

Notrix/E for Notes will run on an OS/2 server. Bond Technologies said it plans to ship the product in the first quarter of next year.

Trinzic Corp. of Palo Alto, Calf., announced a new version of InfoPump 1.1 for connecting Notes users to other databases across a heterogeneous network. InfoPump 1.1, which runs on an OS/2 server, supports VINES and Digital Equipment Corp.'s Pathworks networking protocols and adds support for IBM's DB2 and DEC's Rdb relational database management systems.

It is priced at $25,000.

The ASK Group, Inc. announced that its OpenIngres Intelligent Database can be integrated with Notes through Microsoft Corp.'s Open Database Connectivity Level 1 specification.

Workflow Designs, Inc. of Dallas said its new application, @ActivityBase, provides a Notes repository for contact information and incorporates such tools as opportunity tracking and revenue forecasting functions. Prices start at $1,250 for a 10-user license. ☑

Comments

To comment on this or any article, drop us a fax at (508) 820-3467, call (800) 622-1108, Ext. 487, or message us via Internet at network@world.std.com.

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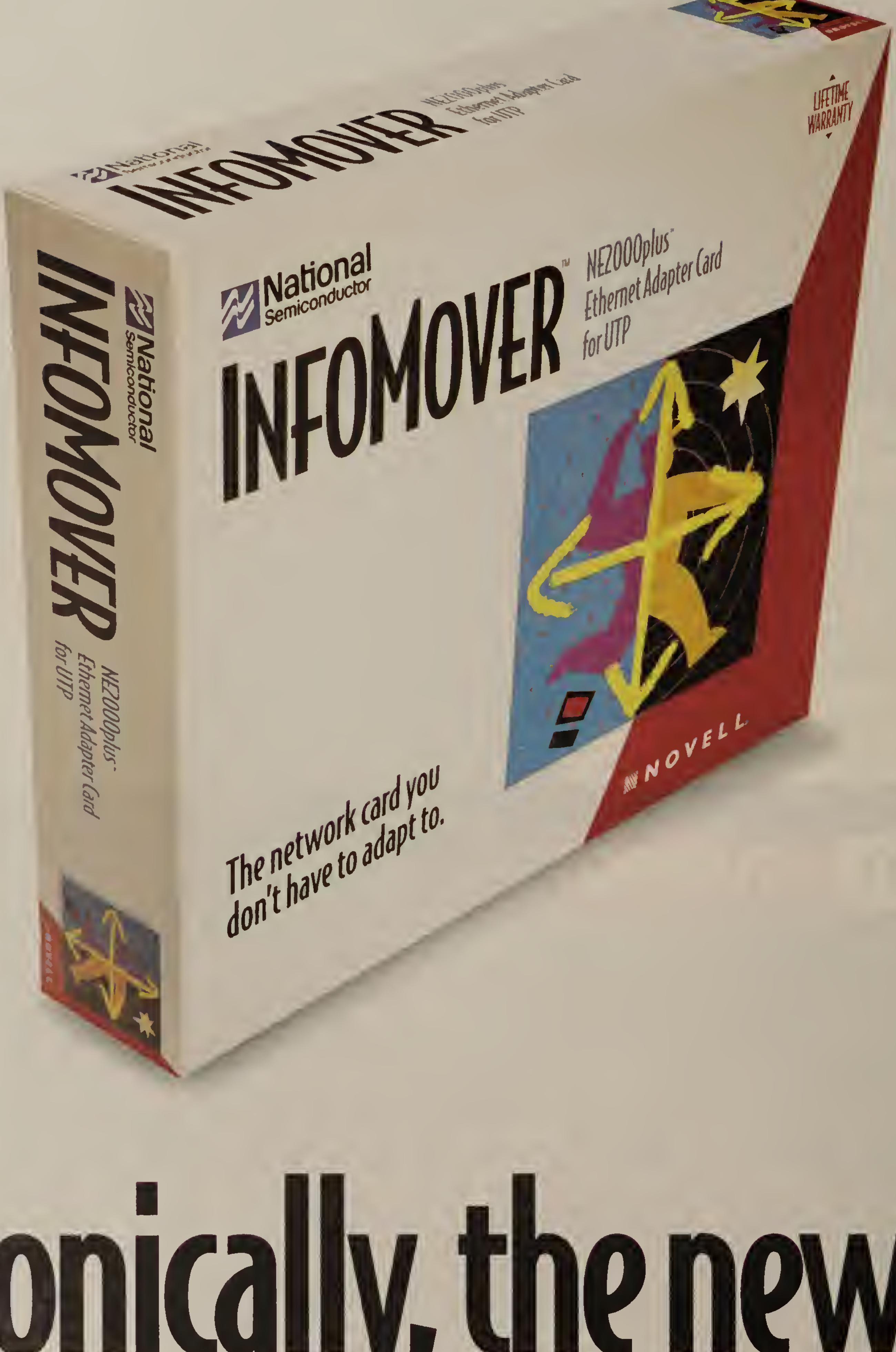

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comes from two

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Editorial

If you're struggling to break new ground or even keep up with competitors, the secret to success may lie hidden in an unlikely place. Probably a dark, rarely visited place like a bottom drawer or the back of a file cabinet, wherein resides the organizational chart for your IS operations.

From CNN to the trade press, you're treated daily to visions of the synthesis of industries and technologies in the digital age. But responsibilities in your IS group are probably divvied up in an outmoded way that neither fosters the sharing of expertise nor helps you break out of the common mold in applying technology. The job descriptions your staffers hew to and the way the cliques within your IS organization interact or don't interact, are probably more reflective of yesterday's application demands than tomorrow's and will do little to move your company toward collaborative computing.

I've brought this issue up in the past as it relates to the need for interaction among network designers and applications developers. Keep these folks separate and you'll learn a great deal more about the move to distributed computing than you ever wanted to know — all the hard way.

But consider also the move to Electronic Commerce — the integration of the electronic communications technologies, such as EDI, messaging and facsimile, that link a company to its business partners.

Using a common backbone and message switching infrastructure to communicate on many levels with customers and suppliers makes sense. There will be technical challenges, to be sure, but the bigger issue appears to be organizational. You have EDI experts and mail administrators, but have the twain met to plot out a plan for intercompany communications? Have they melded minds with application developers to figure out how to integrate EDI and messaging into that next generation of applications?

Need more evidence? Today you probably have separate groups managing systems and networks. Uh-uh. As the network becomes the computer, those disciplines are merging. Keep them apart and you'll continue to struggle to meet growing management demands with static resources.

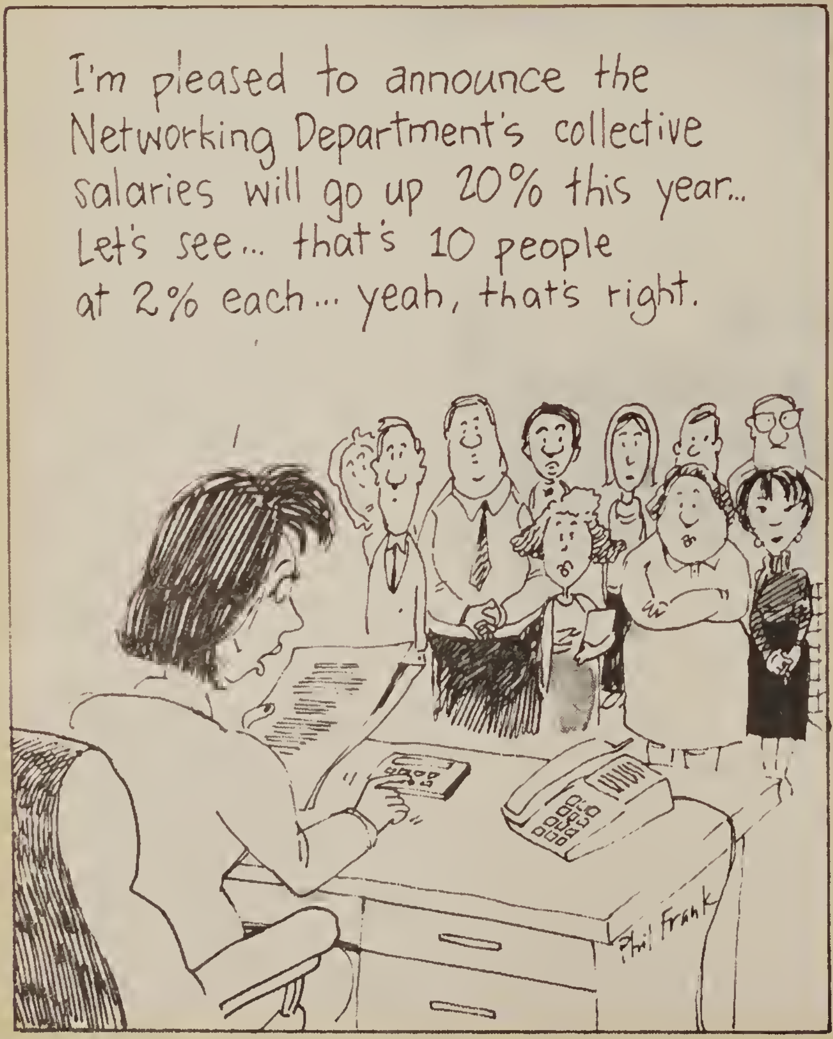
The point is simple: Success — even survival — in the '90s and beyond will rest on your ability to break down yesterday's boundaries and team diverse people to envision new applications and make those visions a reality.

Don't let that organizational chart bind you. Business-process reengineering begins at home.

➺ JOHN GALLANT

TELETOONS

FRANK AND TROISE


I'm pleased to announce the Networking Department's collective salaries will go up 20% this year... Let's see... that's 10 people at 2% each... yeah, that's right.
Phil Frank

DISTRIBUTED COMPUTING

by John R. Rymer

Sun, NeXT face rocky road in bid to beat Windows

Sun Microsystems, Inc. and NeXT Computer, Inc.'s recent decision to team up to produce the "definitive" open distributed computing environment is a marriage built on shaky ground. Unless the two companies can surmount some formidable obstacles, their effort appears doomed to fail.

Sun and NeXT have been bitter enemies fighting over the Unix workstation market. It is difficult to imagine these two companies doing business together. Yet with their new alliance, Sun and NeXT hope to dominate distributed computing by offering users a better, more open environment than Microsoft Corp.'s Windows.

The announcement made just before Thanksgiving that Sun (through SunSoft, Inc., a subsidiary) had adopted NeXT's technology was laden with irony. Executives from both companies uttered glowing words of praise about one another. A year ago such words would have been unthinkable.

There was also an abundance of optimism about the two companies' future prospects now that they have combined their "best-of-breed" technologies. Sun and NeXT believe that by combining SunSoft's Solaris operating environment with NeXT's NeXTStep user and developer environment, they will be able to squash Windows and Windows NT.

Like any marriage, this one will have a honeymoon period in which anything seems attainable. However, beneath the brave words spoken at the press conference there is a weak foundation for the Sun-NeXT marriage. For Sun and NeXT to achieve their goal of producing a platform that will surpass Windows, they must overcome three obstacles. The odds are not favorable that they will be able to do so.

The biggest of these obstacles, ironically, is the product that Sun and NeXT will create. The agreement obligates SunSoft to adopt NeXTStep as its desktop environment of choice. A new version of NeXTStep — this one with published application program interfaces (API) — will become both the user's and developer's environment used to construct applications for SunSoft's next major version of its Solaris operating system. This next version of Solaris is based on Sun's Project Distributed Objects Everywhere (DOE), a set of distributed object computing (DOC) technologies.

By adopting the open version of NeXTStep, SunSoft will fill a hole in its Solaris/DOE technology — the lack of a distinctive user/developer environment. NeXTStep is a good choice to fill this gap. NeXTStep has proven its worth in customer sites. The NeXTStep technology is mature, and NeXT has developed a following for it among independent software vendors.

But what type of product will be created by combining Solaris and NeXTStep? Despite the various layers of technology, the Sun-NeXT product looks to users like just another desktop operating system. Sun is hoping users will make the move to Solaris to obtain the benefits of the NeXTStep environment and a powerful DOC foundation.

SunSoft executives assert that SunSoft's technology is better than Microsoft's. They're right. But it probably doesn't matter because users are less and less disposed to switch from their current desktop operating system to a new one. Microsoft Windows is the clear favorite but there's still a lot of Macintosh, DOS and Unix around as well.

When corporate users think about introducing DOC technology, most do not want to do so by adopting a new operating system. Rather, most want to introduce new distributed computing technologies in a way that is independent of operating systems. Novell, Inc. NetWare, Lotus Development Corp. Notes and all major relational database management system vendor offer users this opportunity.

The Sun-NeXT combination turns its back on the operating-system-independent approach to introducing DOC to customers. It forces users to make a choice they don't want to make.

It could be that users are wrong. History just might prove that users would have been better off adopting a new operating system when they moved distributed computing. But for vendors, of course, the point is to get rich, not to be right. SunSoft and NeXT would benefit from rereading the literature on IBM's experience with OS/2 before proceeding further on their current course.

The second obstacle to success for Sun and NeXT is their relative inexperience in partnering. There are no guarantees that Sun and NeXT will be able to work productively together. NeXT's biggest previous partnership — with IBM — was a disaster. And SunSoft's partnership with Hewlett-Packard Co. on DOC technologies, while productive, has been slow to bear fruit.

The third obstacle is third-party support. SunSoft and NeXT plan to publish the APIs to NeXTStep, which will be called OpenStep. The partners will then donate these APIs to a standards body such as the Object Management Group, Inc. or X/Open Company, Ltd. These APIs would enable third parties to enhance NeXTStep substantially — even to clone it. But it is not clear why either the standards bodies or third-party vendors would take the bait.

I take no pleasure in concluding that things do not look promising for this Sun-NeXT partnership. I'd like to see Sun and NeXT succeed in giving users products that make it possible for them to migrate more rapidly to DOC. The benefits of this approach to information systems are compelling.

Fortunately, there is a way out for Sun and NeXT. They should break the tie between Solaris and the DOE/NeXTStep environment. If Sun and NeXT commit to making the environment available on Solaris, implementations of the Open Software Foundation, Inc.'s Distributed Computing Environment and Windows NT, they will give users a much cleaner migration path to the new technology. However, the software to support such a strategy won't be easy to build — the new mind-set required won't be easy for Sun to adopt.

The alternative for Sun, however, is failure, which is even more difficult. Can Sun and NeXT persuade users to move off of Windows and onto Solaris? I don't think so. Instead, they would be wise to adopt a cross-platform strategy to make their partnership succeed.

➺ Rymer is editor in chief of the *Distributed Computing Monitor*, a monthly report on client/server and other distributed computing technologies published by the Boston-based Patricia Seybold Group, Inc. He can be reached via the Internet at jrymer@mcimail.com.

NAFTA AFTERMATH

by Nathan Muller

Free trade — at a price

The North American Free Trade Agreement (NAFTA), which was approved last month by both houses of Congress and will take effect on Jan. 1, 1994, may have a profound effect on networking professionals — both in financial terms and in the way they manage their careers (*NW,* Nov. 15, page 4).

Throughout the strident debate on NAFTA, not very many professionals in the computer and communications industries questioned how the agreement would impact them. Many believed that the only workers who needed to be concerned about NAFTA were unskilled hourly wage earners whose jobs might be moved to Mexico, where pay and benefits amount to less than the minimum wage here.

Actually, Chapter 16 of the agreement has a lot to say about professionals in the computer and communications industries, including engineers, computer systems analysts, technical writers, consultants and technicians. In fact, the agreement portends big changes for these and 58 other categories of professions.

Today, foreign professionals can enter the U.S. labor market temporarily and in limited numbers only if qualified American professionals cannot be found. Under NAFTA, professionals may be hired from Mexico and Canada, even if qualified Americans are available. While the number of temporary workers allowed into the U.S. is 5,500 per year for the first three years NAFTA is in effect, the U.S. is obligated to renegotiate this restriction after that time.

Regardless of the outcome of these negotiations, in 10 years NAFTA allows an unlimited number of Mexican and Canadian professionals to enter the U.S. labor market on a "temporary" basis — without the requirement of a visa or any other documentation that can be construed as a trade barrier. Once they begin to work here, their temporary status can be extended for an unlimited number of years.

Advocates of NAFTA say that the free movement of professionals across borders is a necessary component of free trade. However, there is a cost associated with that movement.

The cost comes in the form of downward pressure on salaries and benefits — just as it does now when American companies use international employment agencies to hire low-paid contract programmers from India and South Korea, while many American programmers who expect higher salaries continue to look for work. As if to underscore this point, a survey of major companies revealed that 55% plan to use NAFTA as a bargaining tool to lower the pay and benefits to their employees.

While NAFTA proponents claimed that the agreement will create good-paying jobs in Mexico and discourage immigration, this is not how many Mexicans view the situation. In a survey cited in a recent issue of the quarterly journal *Foreign Affairs*, published by the Council on Foreign Relations, over 65% of Mexicans polled said they believed NAFTA will make it easier for them to get jobs here.

In a decade's time, computer and communications professionals may very well see their incomes decline and benefits reduced or eliminated. The corporate executives who supported NAFTA claim this won't happen. But corporate America has a long and shameful track record of saying one thing and doing another.

Now that NAFTA is the law of the land, computer and communications professionals should be advised to proactively manage their careers in order to better navigate the new era of free trade. This may call for more technical education, risk-taking, volunteering for projects and aggressively expanding the scope of present responsibilities to stave off the increased competition that surely looms ahead.

➨ Muller is a consultant in Huntsville, Ala., and an expert in NAFTA and related technology issues. He can be reached at (205) 880-6650 or via MCI Mail at 546-4889.

Letters

Proud winner

MeritCare Medical Group is proud to have been selected by *Network World* for honorable mention in the Ninth Annual User Excellence Awards (Nov. 22, page 50). Awards like these are important because they highlight the role that networked systems can play in support of business needs.

A special thanks to the marketing and support personnel of IBM, Oracle Corp. and Wellfleet Communications, Inc. whose expertise and products we've trusted to make enterprise networking a reality.

Timely trend and product information is needed to keep current with net technology. *NW* is invaluable in keeping us informed.

Gary Gilder
Director of EDP services
MeritCare Medical Group
Fargo, N.D.

Internet access

Regarding Mark Gibbs' column "Your LAN and the Internet" (Nov. 8, page 24):

I wish my company had the budget of Du Pont-Merck Pharmaceutical Co., J.P. Morgan & Company, Inc., Miller Brewing Co. and others — then maybe we could connect our local-area network to the Internet.

Right now I am forced to rent an account at the local university to get access. And just think about this — almost every machine on this LAN already uses Transmission Control Protcol/Internet Protocol. But $20,000 a year is a little too expensive, considering it would take two years to pay for our LAN at that rate.

It was a nice article. Hopefully more companies will become interested, which will enable more cost-effective connections.

Ted Miglautsch
Vice president, product development
Miglautsch Marketing, Inc.
Brookfield, Wis.

The other side

I very much enjoyed reading the two feature articles called "IBM's spin on ATM" (Nov. 15, page 55). There was a lot of good information on this emerging technology that we are all watching. The articles also touched on a topic that I think needs some coverage due to the call for standards and the flight from proprietary systems.

People must understand that there is another side to the argument expressed in the column "Push vendors for interoperability" (Oct. 18, page 37). In the real world, the vendor must differentiate its product from the competition's. There are exceptions, but as the differences grow, the relative interoperability with other products shrinks.

Picture a research and development engineer at a bridge/router company who is told that the customer demands better throughput from them. To satisfy the customer, he proposes a revolutionary compression routine to be implemented on their bridge/routers. It will allow no interoperability with equipment from other vendors, but it will increase throughput manyfold. Marketing estimates that this will be such an advantage that sales will skyrocket. What do they do?

As long as we are theorizing, does the above company submit its revolutionary compression routine to the standards body for inclusion in a future dictum? Would that allow the company to recoup its R&D expenditure? Perhaps a competitor will go one step further before the standards body will act.

Mike Drummer
Senior technology consultant
Perle Systems, Inc.
Westmont, Ill.

Support report

Thanks for your Reader Advocacy Force (R.A.F) article on Cheyenne Software, Inc.'s technical support (Nov. 22, page 4.)

But I hate to see them get away with some marketing/publicity ploy about fast growth and plans to expand their support because that's exactly what they've been doing for years.

I have been using their product for three years and have found their support abominable. (In one case I got a call back *six* months later!) For three years they have been busily apologizing and promising to beef up their support. Instead, I get mouth-breathing, untrained techies who consistently tell me to reformat hard disks, download humongous files and reinstall their program (which usually wipes out all my data to date.)

So to those who are considering purchasing Cheyenne products, I have to add this warning: Not only does the company have lousy support, but they consistently lie about beefing it up.

Cliff Missen
Systems analyst
Physiology and Biophysics Department
University of Iowa
Iowa City, Iowa

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Circle Reader Service #15

Modem MADNESS

During tests of 20 V.32bis modems, Zypcom, Inc.'s Z32b-SX emerged as the best overall performer.

BY DANIEL BRIERE

After throwing a grueling battery of performance tests at 20 popular V.32bis modems, *Network World* Test Alliance partner TeleChoice, Inc. has concluded that, despite the standard, not all 14.4K bit/sec modems are created equal.

When the dust settled, Zypcom, Inc.'s Z32b-SX, ZyXEL's U-1496E+ and Western DataCom Co.'s WorldCom V.32bis modems topped the asynchronous performance list with file transfers speeds that approached 100K bit/sec — speeds that make point-to-point transfer of massive amounts of data possible, even over analog public networks.

In the synchronous tests, the results were markedly different, exposing a high degree of parity among the products. With the exception of only two models — ZyXEL's U-1496E+ and Intel Corp.'s SatisFAXtion 400e — all of the modems capable of supporting synchronous transmissions passed the entire test suite. In fact, 10 modems passed these tests without registering any transmission errors.

A METHOD TO THE MADNESS

The asynchronous and synchronous tests used by TeleChoice were designed to reflect the way these modems are employed at user sites (see story, page 42). Typical synchronous applications include IBM mainframe-to-mainframe communication, as well communication over leased lines. Popular asynchronous applications, on the other hand, include most PC-to-PC communication, personal computer remote control, terminal emulation, and bridge and router communications.

Each modem was subjected to three tests: a synchronous bit error rate test, an asynchronous throughput test that transferred the same file pattern over different network line environments, and an asynchronous maximum throughput test for five common file formats over a clear transmission line. The five file formats were Text (a standard text file), Graphic (a metafile), .EXE (an executable file), Random (an uncompressable file full of random characters), and Mixed 3 (a mixed file containing one-third text, one-third Random and one-third ASCII).

The bit error rate tests were designed to determine the ability of a modem to handle the digital to analog (and analog to digital) conversion. Modems that do a good job of this conversion generate fewer errors.

In order to assess bit error rates at the 14.4K bit/sec line rate utilized by the V.32bis modems, TeleChoice used a bit error rate test that sent 1,000 blocks, each 1,000 bits in size, over each of the 59 lines. A 2047 file pattern was used for the transfer. The 2047 pattern is a pseudo-random data pattern defined by the Telecommunication Standardization Sector (formerly the CCITT) for modem testing.

The modems' terminal flow control was disabled and the data compression and error correction functions were turned off, in order to isolate the performance of the modem.

The data terminal equipment (DTE) rate was set to match the line rate of 14.4K bit/sec, effectively creating a continuous 14.4K bit/sec pipeline through which the file pattern was transmitted synchronously. Modems were not allowed to fall back from this 14.4K bit/sec rate.

Modems passed the synchronous tests if they correctly initiated the connection, maintained the connection and encountered less than 100 block errors in a session.

Only 15 of the 20 modems actually supported synchronous transmission. With the exception of the Intel SatisFAXtion 400e and the ZyXEL U-1496E+, the performance of these 15 modems did not vary much. Ten of the modems performed perfectly, passing this test with zero errors on all 59 lines. Telebit Corp.'s Worldblazer, on the other hand, passed all 59 tests by this criterion but experienced various errors on 35 of 59 lines tested.

Intel's SatisFAXtion 400e experienced errors on a total of 20 lines, failing four of the line tests outright. Also, the SatisFAXtion 400e earned the distinction of recording the most block errors — 72 — on a single line.

The ZyXEL U-1496E+ had its share of problems, too. TeleChoice tested the U-

V.32bis modem vendors

Modem manufacturer	Model (all external models)	Price	Warranty (years)
AT&T Paradyne (800) 482-3333, Ext. 586	Comsphere 3820	$795	2
Boca Research, Inc. (407) 997-6227	14.4K bit/sec External Bocamodem	$379	5
Cardinal Technologies, Inc. (717) 293-3000	14400V32bis	$269	Lifetime
CXR Telecom Corp. (408) 435-8520	AJ V.32bis	$695	1
Digicom Systems, Inc. (408) 262-1277	ScoutPlus	$289	5
Hayes Microcomputer Products, Inc. (404) 840-9200	Optima 144	$499	5
Intel Corp. (800) 538-3373	SatisFAXtion 400e	$399	3
Megahertz Corp. (801) 272-6000	14.4 bit/sec Pocket Data/ Fax Modem	$499	5
Microcom, Inc. (617) 551-1000	Micropórte 4232 with Fax	$699	1
Motorola Codex (508) 261-4183	3261 Fast	$1,695	2
Multi-Tech Systems, Inc. (800) 328-9717	MultiModem II MT1432BA	$799	5
Octocom Systems, Inc. (800) 835-3248	Xpresso 8396A V.32bis	$1,095	2
Penril DataComm Networks, Inc. (800) 473-6745	DX144	$595	2
Practical Peripherals, Inc. (800) 442-4774	PM14400FXSA V.32bis	$549	Lifetime
Telebit Corp. (800) 835-3248	WorldBlazer	$1,099	2
UDS Motorola (205) 430-8000	FasTalk Fax 32bx	$845	2
U.S. Robotics, Inc. (800) 342-5877	Courier V.32bis	$695	2
Western DataCom Co. (800) 262-3311	WorldCom V.32bis	$695	1
Zypcom, Inc. (510) 783-2501	Z32b-SX	$549	2
ZyXEL (714) 693-0808	U-1496E+	$499	5

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1496E+ five times with several strap strings. Strap strings initialize and configure a modem. All tests should have produced similar results. However, results varied substantially, and, in one case, the modem failed five of the line tests.

There were two test runs in which the U-1496E+ performed better than the other three runs. In the first, the U-1496E+ failed two lines outright, with two more lines reporting a marginal number of block errors during the transmission. The other 55 lines, however, reported zero errors. In the other test run, the U-1496E+ passed all the tests, but zero errors were recorded on only 29 lines. ZyXEL's technical staff was able to reproduce these problems and said that a future firmware upgrade will address these synchronous transmission problems.

None of the modems had problems with the tough Line 19 condition, which mimics satellite propagation delays. The Telecommunications Industry Association (TIA) TR-30.3 specification calls for a 700 msec round-trip delay to be inserted in all loop combinations of Line 19. Earlier testing of higher speed modems revealed that some modems running at 19.2K bit/sec speeds and above encountered difficulty sending data reliably over these circuits.

Though the synchronous performance levels of these modems varied little, users can utilize other factors, such as price, to make product distinctions. For instance, of the modems testing well on these lines, the Hayes Microcomputer Products, Inc. Optima 144 offers the lowest price product at $499, with a five-year warranty.

ASYNCH ZIPS ALONG

The asynchronous performance distinctions among the modems were much more dramatic. TeleChoice used two asynchronous application tests to assess the capabilities of these modems. In the first test, TeleChoice tested throughput of 1,000 blocks of 100 characters each across the same 59 line conditions used in the synchronous trial. The 2047 file pattern was used, and data compression was turned off. Terminal flow was set to Request To Send/Clear To Send (RTS/CTS) and each modem was set to its highest DTE rate.

In general, modems that yielded the highest throughput were generally the most consistent, as well. The AT&T Paradyne Comsphere 3820, Megahertz Corp. 14.4 bit/sec Pocket Data/Fax Modem, Motorola Codex 3261 Fast, Penril Datacom DX144, UDS Motorola FasTalk 32bx, U.S. Robotics, Inc. Courier V.32bis, Western Datacom Worldcom V.32bis and Zypcom Z32b-SX all performed perfectly.

Of these, only UDS Motorola's FasTalk Fax 32bx, Western Datacom's Worldcom V.32bis and Zypcom's Z32b-SX consistently achieved uncompressed throughput levels greater than 17K bit/sec across all 59 lines, with the latter two hitting highs of 17.3K bit/sec for each line tested. The UDS Motorola FasTalk Fax 32bx cruised at 17.2K bit/sec.

Another modem worth mention is Megahertz's 14.4 bit/sec Pocket Data/Fax Modem. Though no bigger than a pack of cigarettes, it passed 78% percent of the lines with a throughput of 17.3K bit/sec and never fell below 16.0K bit/sec. Practical Peripherals, Inc.'s

Continued on page 42

Creating the right environment

To ensure a consistent testing environment for the modem review, TeleChoice, Inc. used specialized equipment from Telecom Analysis Systems, Inc. (TAS) of Eatontown, N.J., to simulate the performance of the public network.

The TAS equipment is outfitted with a series of network emulation parameters as defined by the Electronic Industries Association/Telecommunications Industry Association TR-30.3 Subcommittee on Telecommunication Network Interfaces.

This subcommittee has defined seven local loops and 12 end office-to-end office conditions. Various combinations of these loops and central office conditions were paired to yield 59 possible network connections that emulate line conditions on the public network.

The group has prepared two draft standards, PN 3064, which contains the 59-line parameters, and PN 2826, which outlines a recommended procedure for testing modems over these 59 lines. These two PN specifications are expected to be presented for formal approval by the subcommittee as TSB-37A and TSB-38, respectively, by the end of this year. They will then be passed to ANSI for consideration as a standard. TeleChoice, Inc. used these two draft documents as the foundation of its testing procedures.

BY DANIEL BRIERE

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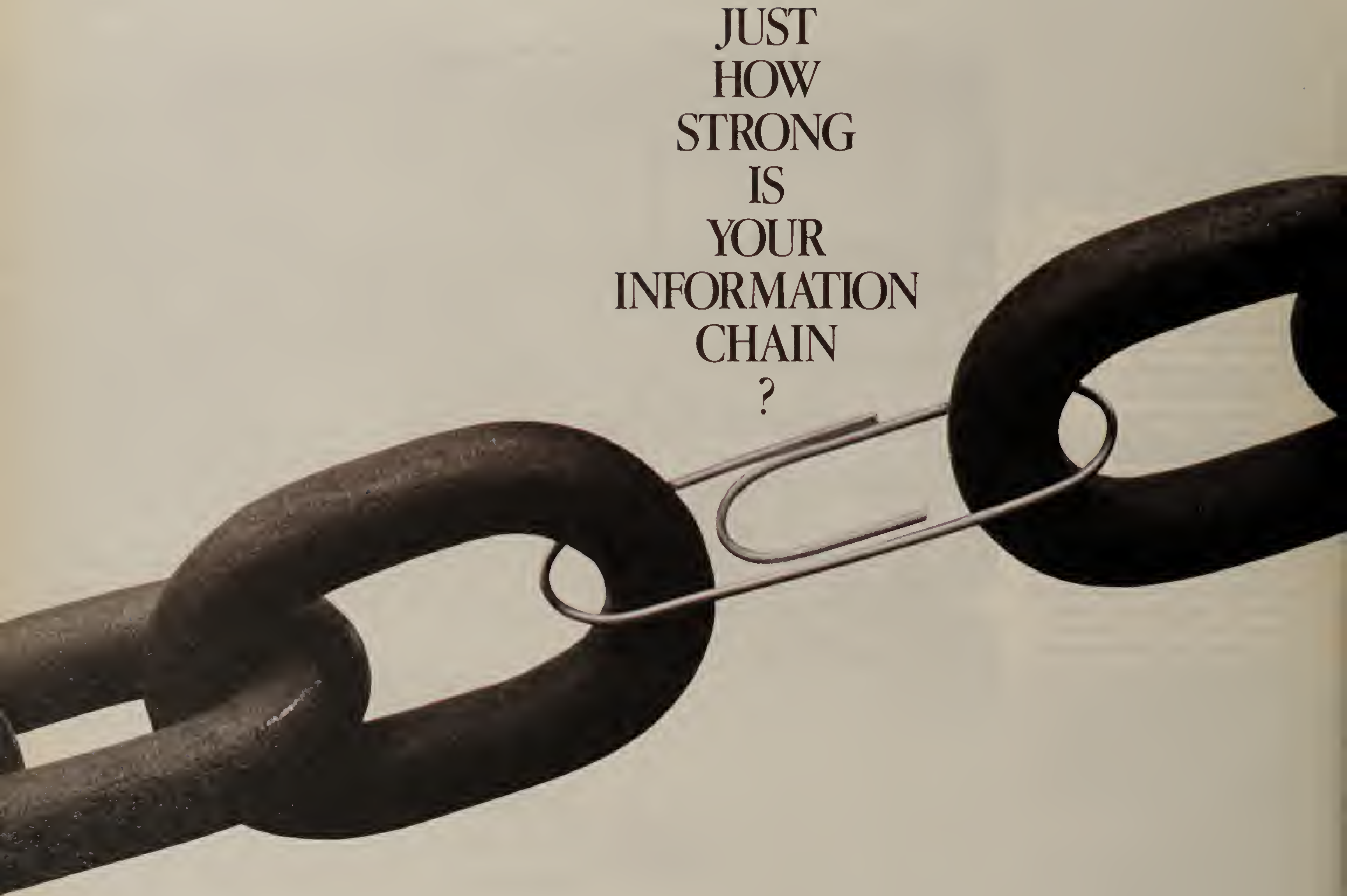

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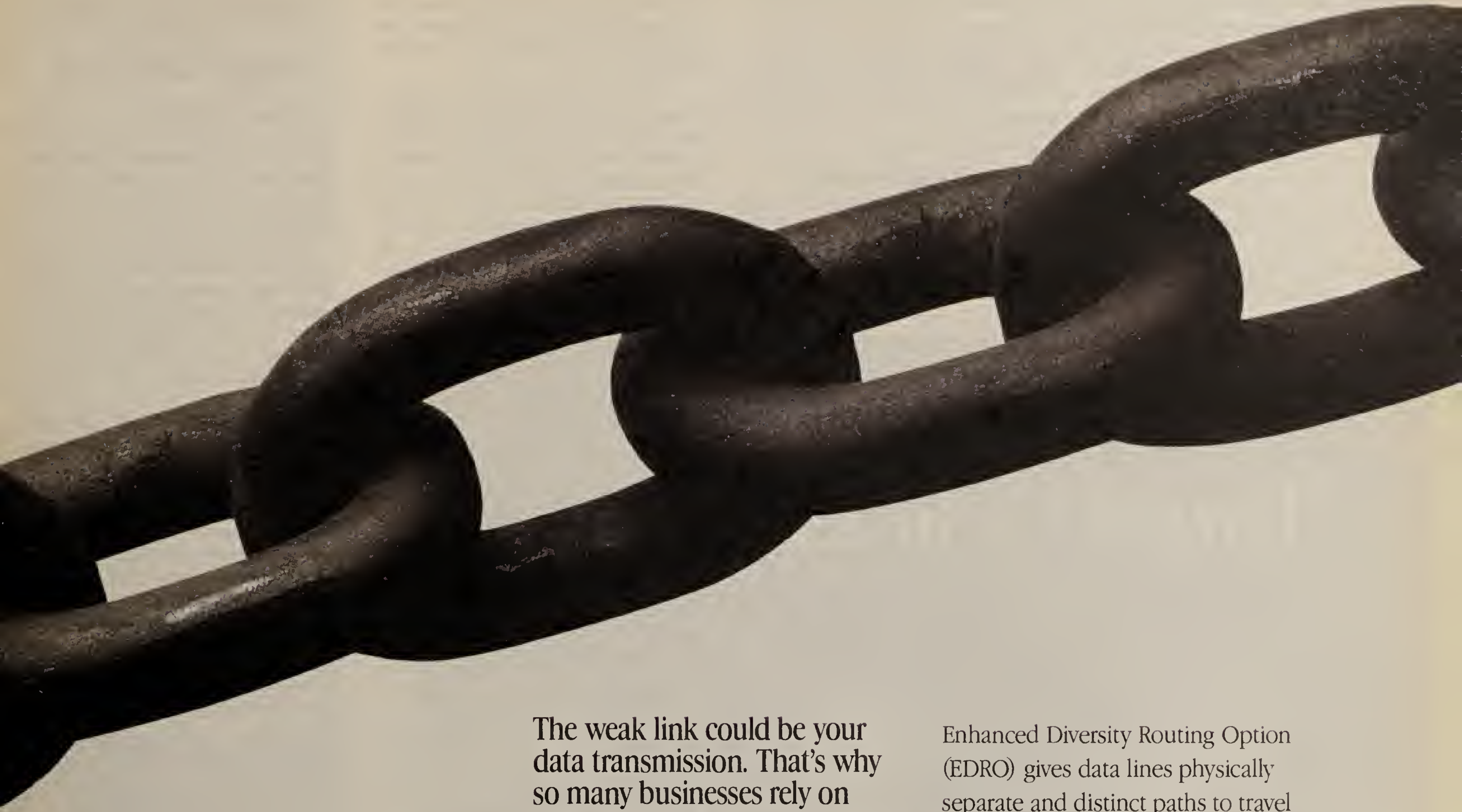

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Continued from page 39

PM14400FXSA V.32bis and ZyXEL's U-1496E+ also performed very well, albeit less consistently than the top contenders. Still, their performance was more than acceptable — each passing most of the lines with throughput in the range of 17.3K bit/sec range and each failing only two lines.

Hayes Microcomputer Products, Inc.'s Optima 144 and Octocom Systems, Inc.'s Xpresso 8396A V.32bis modems performed fairly well for most line conditions, but choked on all seven of the tough Line 19 satellite emulation conditions. (Note that Octocom Systems recently merged with Telebit Corp., and the Xpresso model is now offered by Telebit.)

At the other end of the spectrum was Cardinal Technologies, Inc.'s 14400V32bis modem, which consistently failed to initiate connections and frequently lost connections during transfers. The modem was only able to pass 44 of the 59 network lines tests.

NO HOLDS BARRED ASYNCH

TeleChoice's third and final test clocked the modems' peak performance. All modems were configured to perform at their absolute optimal rate. Five asynchronous file formats were sent over a clear line (Line 17c1). The DTE rates were set to their maximum levels. Data compression and error correction were turned on, and terminal flow control was set to RTS/CTS.

In this trial, the differences among modems became obvious. Western Datacom's WorldCom V.32bis, Zypcom's Z32b-SX and ZyXEL's U-1496E+ were among the top performers in this throughput test. The Z32b-SX placed first in Graphic and Text files, zipping by at an amazing 98.27K bit/sec on the Graphic file. The WorldCom matched the Z32b-SX's Random file-transfer performance, but edged it out

Is V.32bis the right choice?

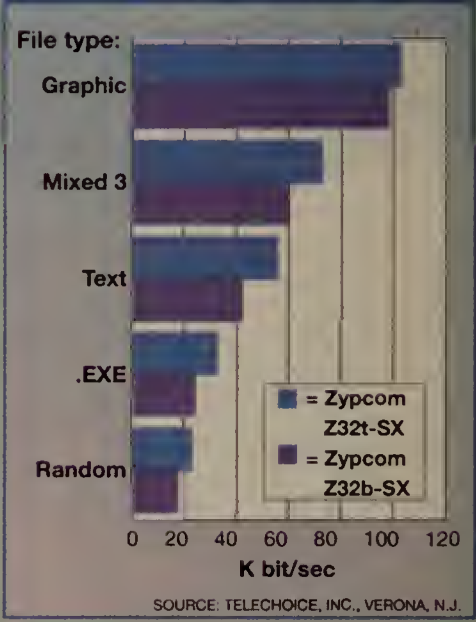
When TeleChoice, Inc. examined modems with speeds of 19.2K bit/sec and higher earlier this year (*NW*, May 10, page 40), it found that the AT&T Paradyne Comsphere 3810/3830, ZyXEL U-1496E and Zypcom, Inc.'s Z32t-SX came out on top for asynchronous applications, while the Motorola Codex 3261 Fast proved best for synchronous duties. So how do these results compare to the performance of V.32bis modems?

TeleChoice retested the new erasable programmable read-only memory version of the Zypcom Z32t-SX and compared the performance to that of the Z32b-SX, its V.32bis counterpart. The Z32t-SX outperformed its sister modem by 25% for the asynchronous performance tests for the Random, .EXE and Text files, which are representative of average files transferred in an asynchronous environment. The performance gains associated with the Graphic file, however, were more modest — a mere 4.5% increase. In sum, the Z32t-SX is priced about 25% higher than the Z32b-SX — it costs $749 for the data and facsimile version. But if maximum throughput is the goal, the high-speed Z32t-SX may be a better choice.

Still, the question for many users is whether their computers can handle the transmission offered by the higher speed modems. The data with the 19.2K bit/sec modem comes so fast that a slow computer, such as a 386-33, could flow-control five times as much as with the 14.4K bit/sec modem, actually slowing overall throughput. For people with older, slower systems, such as 286-based computers or lower, the 14.4K bit/sec modems are the best bet.

BY DANIEL BRIERE

How V.32bis modems stack up



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in the .EXE file test. The U-1496E+ cruised through the Mixed 3 file at 64.57K bit/sec, followed closely by Motorola Codex's 3261 Fast at 63.72K bit/sec.

The most disappointing showing came from Octocom Systems' Xpresso 8396A V.32bis, which consistently finished last in throughput on all five files. Its throughput rate for the Graphic file transfer was almost five times slower than Zypcom's Z32b-SX. Octocom System's modems were designed for deployment in multinational networks and, thus, incorporate enhanced error correction and throughput monitoring. The result is better noise performance at the sacrifice of throughput performance. Hayes Microcomputer Products' Optima 144 modem also demonstrated rather marginal performance, typically running at speeds well below the top modem speeds in the tests.

OTHER CONSIDERATIONS

In some tests, particularly the synchronous suite, several modems demonstrated equal performance. In such cases, users may want to look more closely at other issues, such as ease of use, upgradability, facsimile support, documentation and support.

Conveniently, the high performers generally were the easiest to configure, requiring the fewest number of AT straps and offering autobauding capability up to 115.2K bit/sec. The Motorola Codex 3261 Fast modem, however, was unable to autobaud to 115K bit/sec and had to be manually set.

A good ease-of-use measure is compatibility with existing software applications. The ability to select preconfigured setup strings for the modems from within the applications, for instance, is a useful feature. We tested these modems with various existing applications for the Macintosh platform and found that the newer modems, such as Zypcom's Z32b-SX, did not have predetermined setup modules with some of the popular packages. Zypcom attributed this shortcoming to the newness of the company and said that it has started a software compatibility program this summer to rectify this situation.

In most cases, modem upgrades could be performed by simple replacement of the firmware erasable programmable read-only memory (EPROM). In fact, during the testing process, several of the modem manufacturers issued new firmware for their modems. Intel's SatisFAXtion 400e, for example, required a new EPROM to perform bidirectional transfers. Both Zypcom and ZyXEL issued new versions of firmware shortly after shipping their modems. A few other manufacturers issued new EPROMs to address bugs found during testing. Sometimes these upgrades fixed the problems and other times they did not. But they were always quite easy to install.

Users should not underestimate the importance of technical support and documentation. TeleChoice found the TWINCOM 144/DF modem so difficult to set up and the technical support so inaccessible that it was dropped from this review.

In contrast, Intel's technical support was the easiest to deal with, while Motorola Codex's documentation, which made use of large print, a comprehensive index, clear headings and instructional language for complex topics, was the most user-friendly.

For sites with small physical size requirements, the Western Datacom's Worldcom V.32bis, which is approximately the size of a deck of cards, is the best bet. Its performance is not too shabby, either. Worldcom costs only $695 and has a one-year guarantee. Megahertz's 14.4 bit/sec Pocket Data/Fax Modem and Microcom, Inc.'s Microporte 4232 with Fax both easily fit into a laptop carrying case or

Continued on page 56

Synchronous bit error rate test results

Vendor/model	Number of line tests passed	Number of line tests passed without errors
AT&T Paradyne Comsphere 3820	59	59
CXR Telecom Corp. AJ V.32bis	59	59
Hayes Microcomputer Products, Inc. Optima 144	59	59
Motorola Codex 3261 Fast	59	57
Multi-Tech Systems, Inc. MultiModem II MT1432BA	59	59
Octocom Systems, Inc. Xpresso 8396A V.32bis	59	59
Penril DataComm Networks, Inc. DX144	59	58
Practical Peripherals, Inc. PM14400FXSA V.32bis	59	59
Telebit Corp. WorldBlazer	59	24
UDS Motorola FasTalk 32bx	59	59
U.S. Robotics, Inc. Courier V.32bis	59	59
Western DataCom Co. WorldCom V.32bis	59	59
Zypcom, Inc. Z32b-SX	59	59
ZyXEL U-1496E+	57	55
Intel Corp. SatisFAXtion Modem 400e	55	24

SOURCE: TELECHOICE, INC., VERONA, N.J.

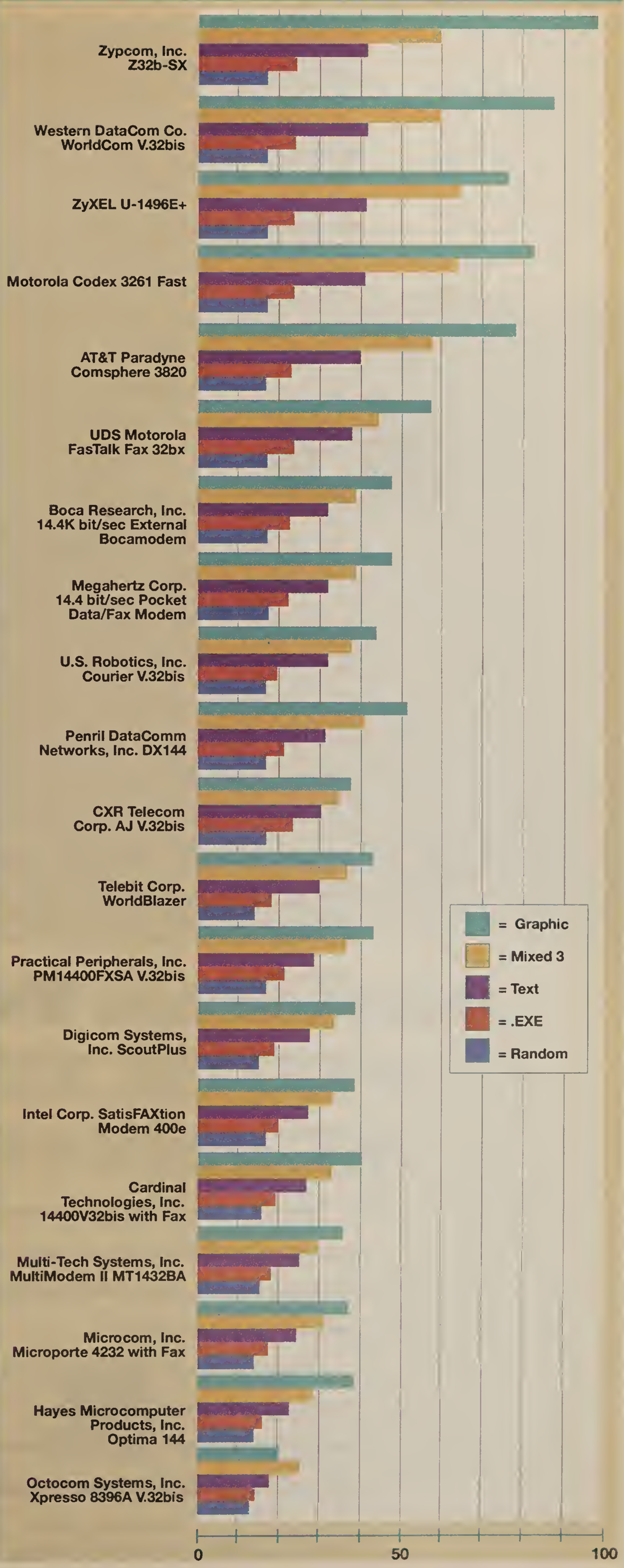
Asynchronous performance

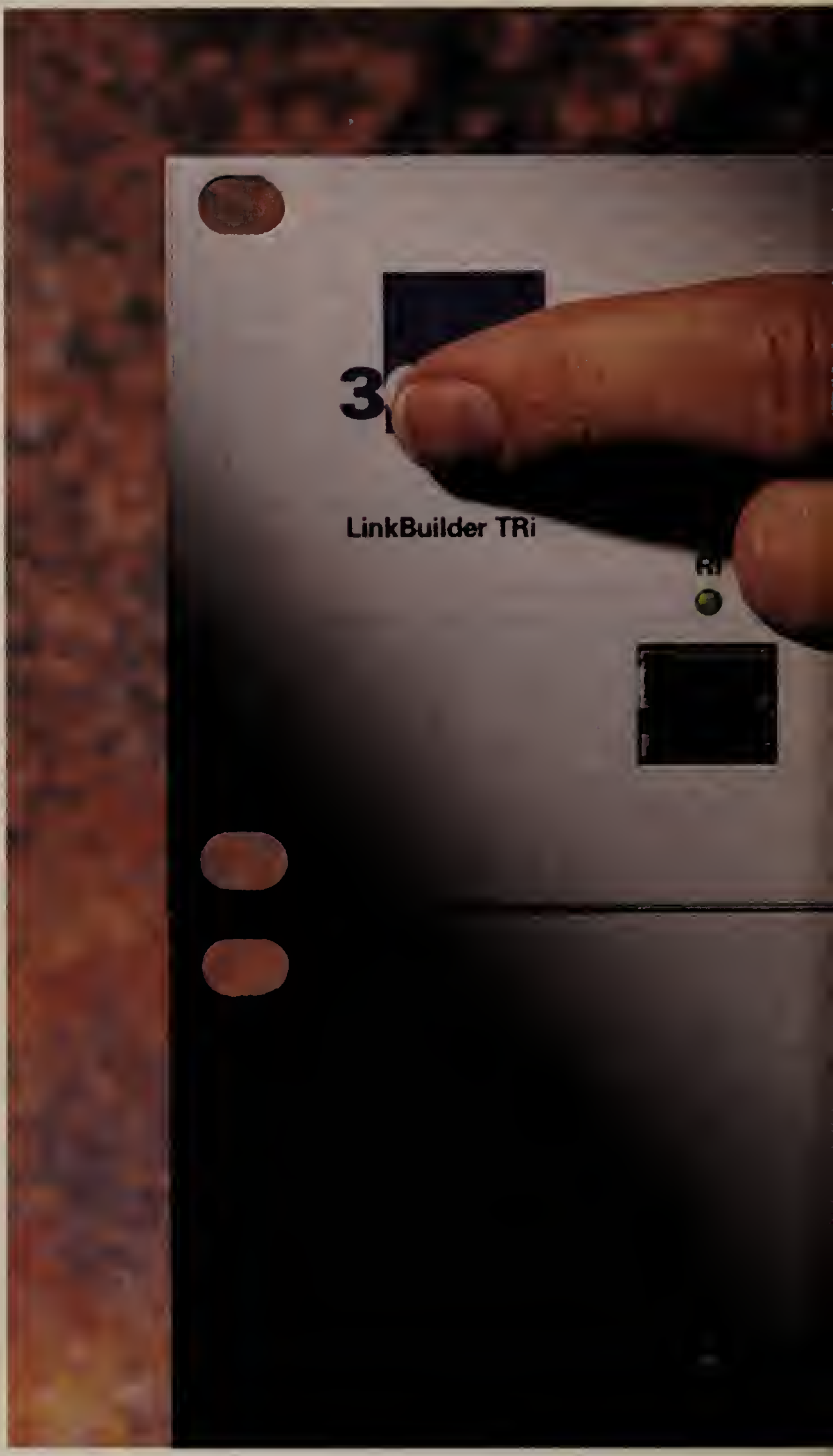
Vendor/model	Number of line tests passed	Number of line tests passed at >17K bit/sec
AT&T Paradyne Comsphere 3820	59	59
Megahertz Corp. 14.4 bit/sec Pocket Data/Fax Modem	59	46
Motorola Codex 3261 Fast	59	57
Multi-Tech Systems, Inc. MultiModem II MT1432BA	59	59
Penril DataComm Networks, Inc. DX144	59	0
UDS Motorola FasTalk 32bx	59	59
U.S. Robotics, Inc. Courier V.32bis	59	0
Western DataCom Co. WorldCom V.32bis	59	59
Zypcom, Inc. Z32b-SX	59	59
Telebit Corp. WorldBlazer	58	0
Practical Peripherals, Inc. PM14400FXSA V.32bis	57	49
ZyXEL U-1496E+	57	44
CXR Telecom Corp. AJ V.32bis	55	52
Hayes Microcomputer Products, Inc. Optima 144	52	0
Boca Research, Inc. 14.4K bit/sec External Bocamodem	51	44
Digicom Systems, Inc. ScoutPlus	48	0
Octocom Systems, Inc. Xpresso 8396A V.32bis	48	1
Microcom, Inc. Microporte 4232 with Fax	46	8
Intel Corp. SatisFAXtion Modem 400e	45	0
Cardinal Technologies, Inc. 14400V32bis with Fax	44	0

GRAPHIC BY TERRI MITCHELL

SOURCE: TELECHOICE, INC., VERONA, N.J.

Asynchronous throughput (K bit/sec) test over clear lines





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Users to take DCE live

CONTINUED FROM PAGE 1

DME isn't even close to the launching pad.

"It's unfortunate, from a user point of view, that this has happened," says David Chappell, principal of Chappell & Associates, a Minneapolis consultancy. "And yet the OSF has no choice. If their potential licensees don't want what they're producing, they simply can't afford to produce it."

The OSF can, however, afford to produce DCE because vendors are gobbling it up. DCE is intended to provide a common set of services for developing distributed applications that can run on multivendor hardware dispersed throughout an enterprisewide client/server network.

Those services include a remote procedure call (RPC), threads, and directory, time and security services. A distributed file system is available as an optional DCE application that uses the underlying services.

DCE's RPC distributes application processing across multiple systems in the network. Under an RPC transaction, a system, usually a network client, asks one or more computers across the network for help in processing a compute-intensive task.

RPCs typically reside on both clients and servers in a network.

A company, for instance, could be running a complex application that may eat up a significant block of time if run on a single system. By employing RPCs, the task is broken down into several smaller ones and run concurrently on multiple systems within the network, some of which may be very high speed computers.

The result is an application that takes less time to compute and a solution that's arrived at much faster.

Another DCE service, Threads, allows an application to perform more than one process or routine at a time in parallel. For example, one thread can execute application logic, while another can process user input.

A single-threaded application, meanwhile, executes routines sequentially, one at a time.

Threads is integrated in DCE client and server application code. It allows applications to exploit the parallel processes inherent in a distributed network.

A client workstation application, for example, can use Threads to make multiple requests for services from one or more servers. A server application, meanwhile, can use Threads to service multiple clients concurrently.

DCE's directory services, meanwhile, are used to name elements of the distributed computing environment, such as clients and servers, and particular applications and network services. The directory service also provides information on the element's location.

DCE supports two directory services: a cell directory service and a global directory service. A cell, in OSF parlance, is equivalent to an enterprise network domain, or subnetwork. It can include 10 nodes, or tens of thousands of nodes.

So DCE's cell directory service is used to name and locate elements of a DCE subnetwork, or network domain.

Each element that's named in the DCE cell directory service will contain information and attributes that describe the element. For example, an entry about a network's print services will include information on which server provides the service. Conversely, an entry about a particular server will state that it is the server that is responsible for providing the network printing service.

STUART SIEGEL

CHAPPELL

The global directory service, which runs on DCE servers, provides the names and locations of elements included in all of the cells that make up the enterprise distributed computing environment. DCE supports both the Open Systems Interconnection X.500 and the Internet Domain Name Service global directory services.

The global directory services also provide intercell directory linkages with the aid of a gateway, which is called a global directory agent. The directory agent maps the names of cell elements to and from names on the global directory.

DCE's directory services keep the names and addresses of all network nodes straight, but a distributed environment also has to run like clockwork. That's where DCE's distributed time service fits in.

The distributed time service provides a single time reference for scheduling and sequencing the processing of distributed applications. The time service, which runs on DCE servers, regulates the clocks of the systems in a distributed environment so they are synchronized with one another.

It also assures that system clocks match a standardized time reference, Coordinated Universal Time, that is administered by the International Time Bureau.

While timing is a critical DCE element, keeping the network tamperproof is just as important. To ensure a secure distributed environment, DCE includes security services. These services are intended to eliminate the potential for users to eavesdrop on data flowing across the network, tamper with a transmission or impersonate another user to gain access to unauthorized data.

DCE accomplishes this by enforcing user authorization and authentication, as well as data integrity and privacy.

An authentication facility verifies the identity of users. This ensures that data has not been forged and that a user can not impersonate another user in order to obtain access to unauthorized data. Authorization controls access to particular services and resources by establishing and checking user passwords.

Data integrity facilities check data and messages to make sure they arrive intact and unaltered. And data privacy ensures that data and messages traversing the network can't be intercepted or read by unauthorized users.

DCE's security services are based on the Kerberos network authentication service developed at the Massachusetts Institute of Technology.

Finally, DCE's Distributed File System (DSF) application manages networkwide directories and files, and provides access to them for users located anywhere on the network.

DFS makes remote files appear as local files. Users access them via the same set of file operations they use to access local files, regardless of where or on what system in the network those files are stored.

WAIT AND DCE

The technologies that comprise the DCE were contributed by several vendors, including IBM, Digital Equipment Corp. and Hewlett-Packard Co. OSF integrated the technologies to form the DCE framework and is licensing the framework back to those companies, as well as to other large and small hardware and software vendors.

Companies integrate OSF's DCE code with their operating systems and sell the resulting product to end users. To date, 29 hardware and software vendors are offering DCE products.

Two of the industry's most influential vendors, Microsoft Corp. and Novell, Inc., are, however, somewhat less supportive of DCE. Many view the product development activities of these heavyweights as competitive countermeasures to DCE.

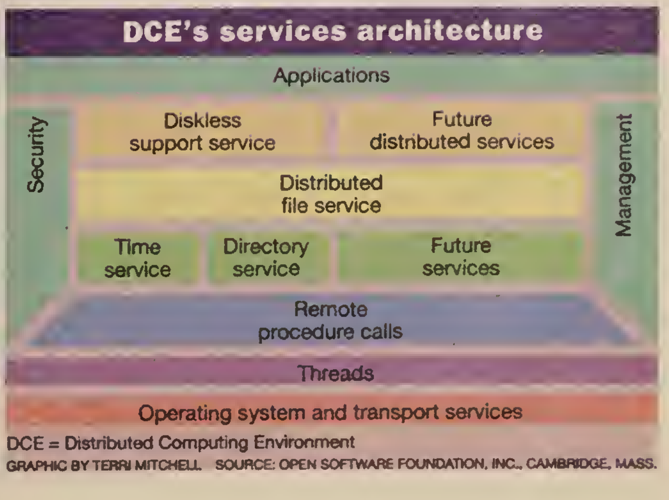
Microsoft, for example, has built distributed computing hooks into its Windows NT operating system, such as an RPC service. Microsoft is attempting to make NT, which can run on a range of hardware platforms based on various microprocessors, the de facto standard operating system for clients and servers.

Microsoft did not respond to requests for interviews on its DCE position. But analysts say the RPC in NT is compatible with DCE's RPC, meaning Windows NT applications can kick off remote procedures on DCE servers, and vice versa.

Novell's NetWare local-area network

Continued on page 52

DCE's services architecture



DCE = Distributed Computing Environment

GRAPHIC BY TERRI MITCHELL SOURCE: OPEN SOFTWARE FOUNDATION, INC., CAMBRIDGE, MASS.

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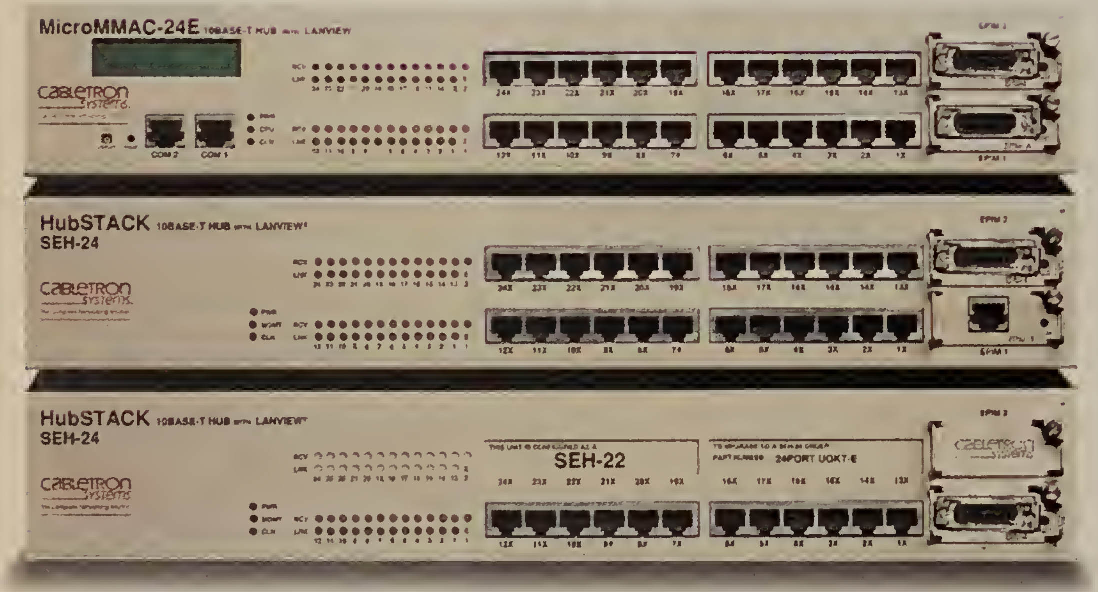

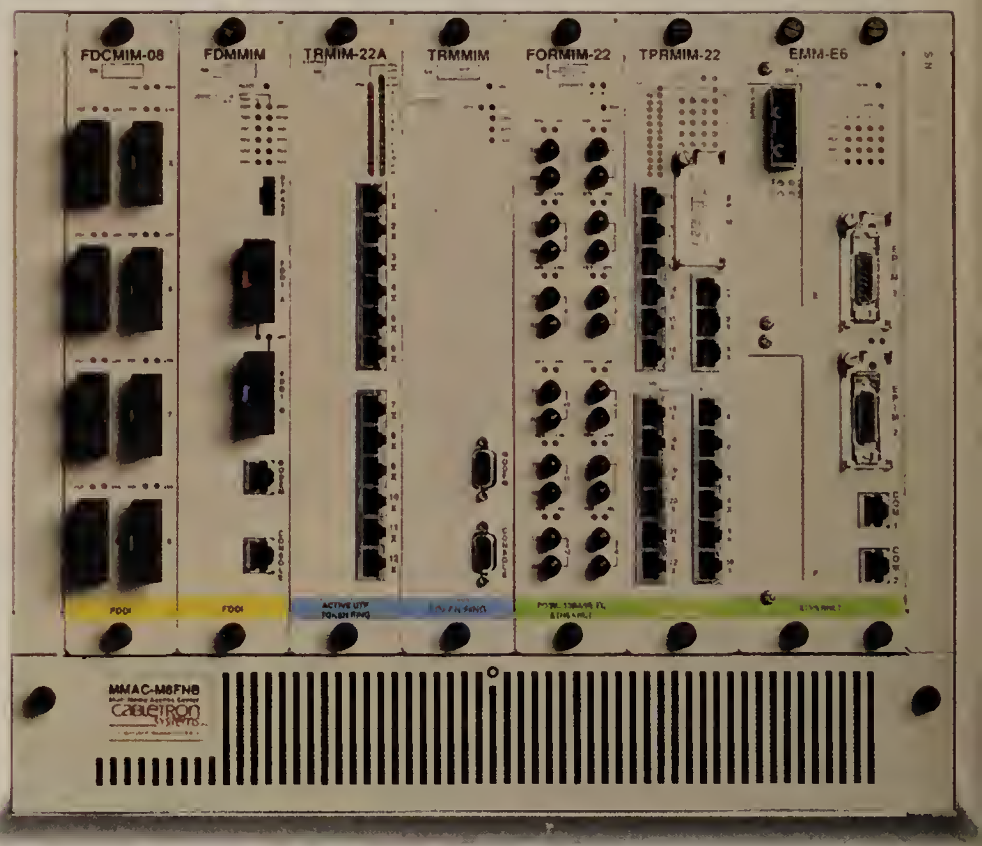

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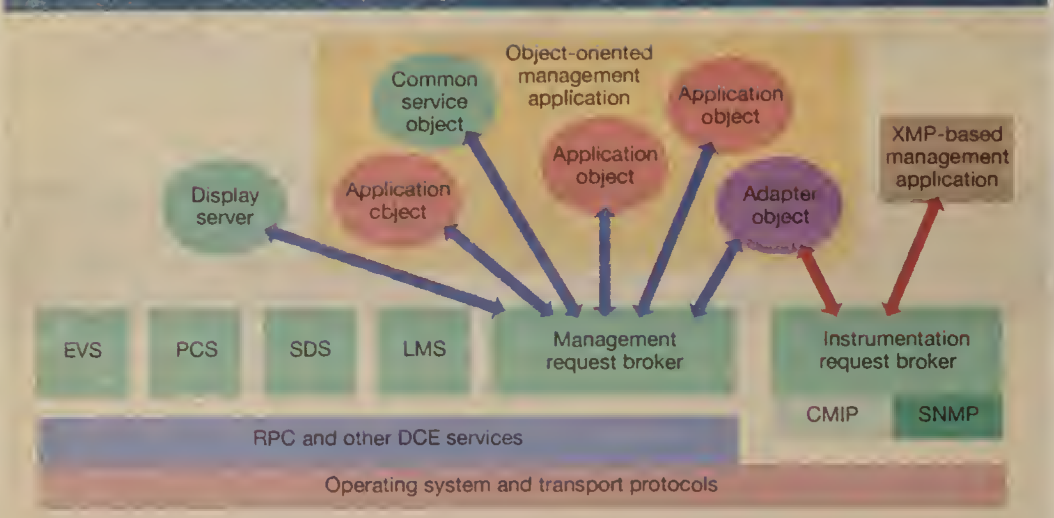
Continued from page 47

operating system, meanwhile, is already a de facto standard with about 60% market share. Although Novell's Unix System Laboratories subsidiary offers DCE products, it's doubtful that users will see DCE from the NetWare side of the house.

DME component relationships


Common service object
Object-oriented management application
Application object
Display server
Application object
Application object
Adapter object
XMP-based management application
EVS
PCS
SDS
LMS
Management request broker
Instrumentation request broker
CMIP
SNMP
RPC and other DCE services
Operating system and transport protocols

CMIP = Common Management Information Protocol
DCE = Distributed Computing Environment
DME = Distributed Management Environment
EVS = Event Services
LMS = License Management Services
PCS = PC Management Services
RPC = Remote procedure call
SDS = Software Distribution Services
XMP = X-Open Management Protocol

GRAPHIC BY TERRI MITCHELL

SOURCE: OPEN SOFTWARE FOUNDATION, INC., CAMBRIDGE, MASS.

"We think the idea is very good and the functionality is useful for customers," says Bob Young, vice president of marketing for Novell's network products division. "The challenge we have is that we've delivered [similar] functionality prior to anyone in the industry. While OSF has pulled together a group in order to deliver directory, timing and other types of network services, we're shipping products."

Young adds that DCE is Unix-centric and fails to take into account some of the requirements for personal computer-based networking, such as the limited memory, disk space and processing power of most of the PCs in use today.

Nonetheless, Novell is developing gateways to foster interoperability between NetWare 4.0 and DCE environments. One such gateway will allow DCE clients to access NetWare directory services, he says.

OSF and users say it would be nice to have the strong backing of these two industry behemoths. "Clearly, we would prefer for them to be saying, 'Yeah, DCE,'" said Jeanette Horan, OSF vice president of interoperable technologies. "But I think the fact that Microsoft is providing any DCE strategy at all is an indication that they realize the impact it will have on the marketplace.

OSF says their less-than-total commitment doesn't dampen industry enthusiasm for DCE, but users are divided on that issue.

Features planned for DCE Version 1.1

- New administration tools
- Enhanced security
- Troubleshooting
- International support

"Novell is trying to figure out how they can provide gateways to allow [NetWare] to interoperate [with DCE]," Horan continues. "As far as I'm concerned, they have a strategy for interoperability, and I think that's wonderful."

James Hoffman, senior vice president of systems engineering at MCI Telecommunications Corp. in Arlington, Va., agrees.

"It's not unreasonable for Novell and Microsoft to say they will comply with certain aspects of it, but they are also obviously driving some of their own de facto standards work," Hoffman says. "That does not surprise me at all. This is not a black and white environment."

But it's of concern to 3M Corp.

"It weakens the momentum toward widespread implementation of DCE by other independent software vendors" who would also develop applications to Windows NT and NetWare, said Al Norton, director of information architecture at 3M.

PRESSING CONCERNS

Other users say there are more-pressing concerns with DCE, such as how to administer and manage an enterprisewide DCE environment. That's where DME should've come into play.

DME was intended to define a vendor-neutral, object-oriented blueprint for peer-to-peer network and systems management in a distributed computing environment. It was to include three components: an object management framework, a network management option and distributed services.

As initially envisioned by the OSF, the object management framework was an application development environment that would have enabled users and vendors to build object-oriented management applications. It was to include management request brokers — which would allow applications and objects to communicate — object servers for executing tasks, event notification services and an object data repository.

The network management option (NMO), which OSF is still developing, defines manager-to-agent communications for DME using the Simple Network Management Protocol, the Common Management Information Protocol and other legacy protocols. NMO is intended to allow object-oriented management applications to access existing management applications and devices using current management protocols and access methods.

Distributed services are applications that actually rely more on DCE than they do on DME's object management framework or NMO. The services, which ride on top of DCE, are intended to provide a uniform set of management functions to a distributed computing environment.

DME's distributed services include: software distribution and license management, which enable the controlled dispersal and tracking of application software in distributed environments for access and license reporting purposes; PC management for incorporating and managing PCs in a distributed network; event management to monitor and track significant occurences and actions on all nodes in a distributed environment for systems management, trouble shooting and remote problem resolution; and subsystems management for monitoring and managing continuous processes within a system on which proper execution of an application depends.

A network print management service also was to be included in the DME distributed services offering. But that component was dropped because it didn't provide any functionality beyond what is on the market today, according to OSF.

The rest of the distributed services are shipping now, and NMO will ship in mid-1994. But OSF has scrapped plans to develop the object management framework, the most important and innovative piece of the DME project, and the component that would have allowed OSF to deliver on its original DME promise.

Why was the object framework deleted? Originally, it was to have been developed with code from Tivoli Systems, Inc. and IBM.

The IBM component, called the data engine, holds objects that continuously poll devices in a network to monitor and control their operation and performance. The Tivoli piece, called Object Dispatcher, holds objects that are best suited for short-lived, task-oriented operations, such as adding or subtracting users from the network.

IBM's data engine, however, was subsequently discarded because it was too complicated to integrate with other DME technologies (*NW*, June 15, 1992, page 2).

Work then focused on Tivoli's technology. But the company's object technology also posed a problem: it's proprietary.

In 1991, OSF selected technology from various vendors that comprise the DME. At that time, Tivoli had the "best-of-breed" object-oriented network and systems management technology of the vendors that responded to the OSF's request for technology.

But less than a year after OSF made its selections, the Object Management Group (OMG), a Framingham, Mass., consortium of companies defining standards for object-oriented programming and computing, released its Common Object Request Broker (CORBA) Architecture specification. As a standard for allowing object-oriented applications to exchange messages via an ORB, CORBA quickly garnered the endorsement of most of the industry powerhouses, including OSF founders IBM, DEC and HP.

So OSF then huddled with Tivoli, IBM and HP to figure out how to make Tivoli's technology CORBA-compliant. This was happening while IBM, HP and other vendors were busy making their own management platforms CORBA-compliant.

"Many of our customers said they can't afford to wait" for DME, says Larry Robinson, HP's OpenView platform marketing manager. "We have to make choices now and move ahead, and look to the vendors to roll in interoperable technologies as they become available through OSF, OMG and others."

As OSF mulled the task at hand, it kept sliding out the release date for the object framework. Initially, it was to be released this month. Then during the first quarter of 1994, then mid-1994 and then mid-1995.

Finally, after realizing that its work was redundant with what vendors were already doing and that vendors would beat it to market with their own CORBA-compliant management products, OSF abandoned work on the framework. Instead, OSF will refer users to the appropriate CORBA frameworks and management objects — software that sits atop management frameworks and performs data collection, node discovery and graphical representation of managed systems and devices — from various vendors that can use DCE as an interoperable distributed computing infrastructure.

"All of the systems vendors are producing their own brokers, and everybody's saying that OMG and the CORBA specifications are the ones that they're going to support," Horan says. "So there is no benefit to OSF in developing the same thing. We don't add anything in that space. OSF's overall goal is to help the industry solve problems, not to create more by providing a competing implementation."

Continued on page 56

DCE secures net events

There's a lot more at work behind the scenes in a Distributed Computing Environment (DCE) than just a simple client/server transaction. In a network based upon the DCE, client-initiated requests — to gain access to a database server for instance — set several events in motion.

When a database server fields a client request, it first has to make a remote procedure call (RPC) to a security server in order to acquire an authentication "ticket." This ticket proves to the directory server that the database server has a legitimate request for data.

The database server must then export its binding information to the directory server. This information instructs a client DCE application on how to link to the server and access its data.

But before the client imports the database server's binding information, it too must acquire an authentication ticket from the security server to prove its identity to the directory server.

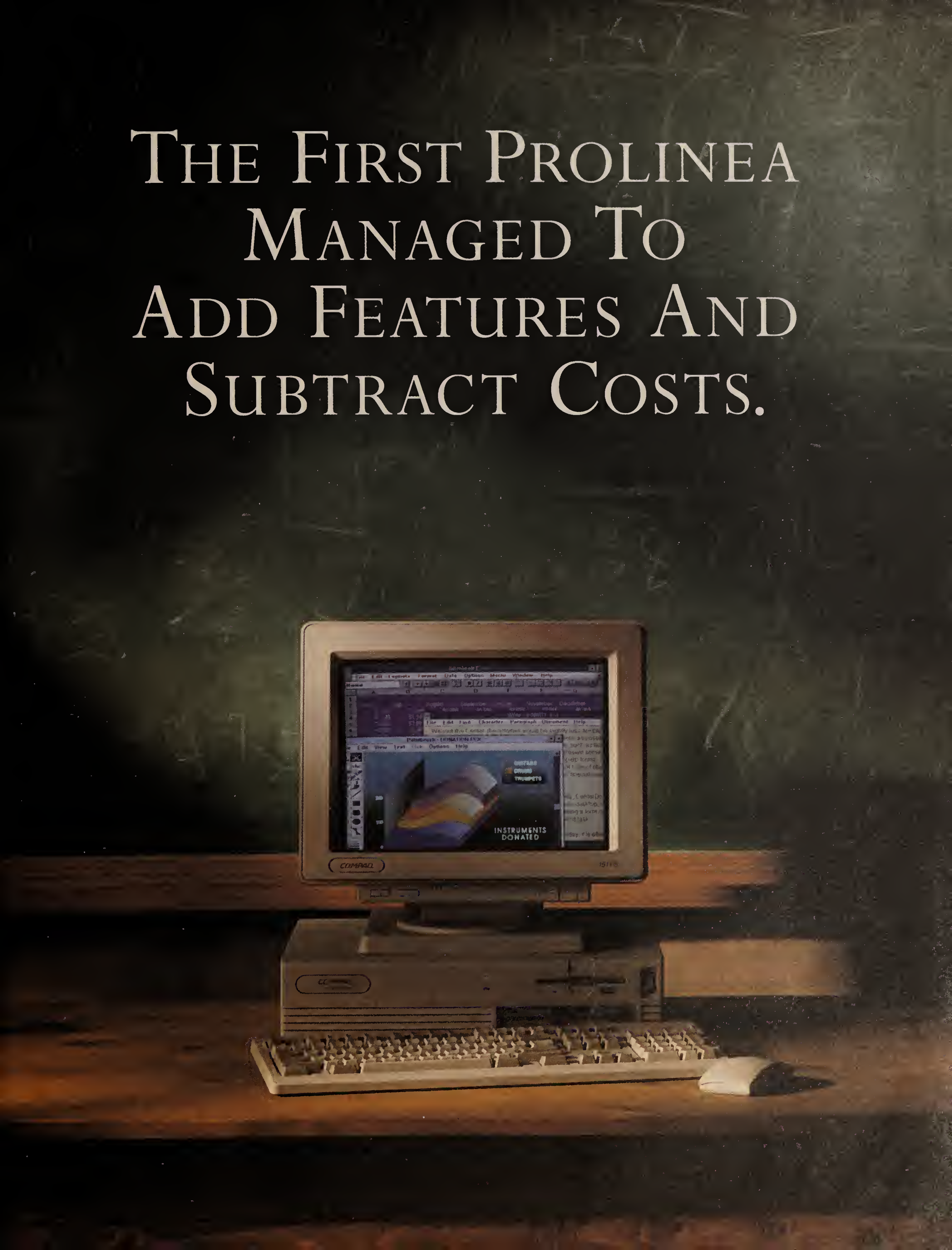
If the ticket is granted, the client then imports the database server binding information from the directory server. To actually access the database server, though, the security server has to grant the client another authentication ticket so it can "prove" its identity to the database server.

When proof has been provided, the client issues an RPC to the server and data is exchanged.

Most of these processes occur only once in a DCE client/server transaction. The database server will dump its binding information into the directory server when it's booted up. Similarly, the client will import this information when it initially requests access to that server.

And authentication tickets are issued the first time the client accesses the server, and only then. After that, clients and servers interact directly via RPCs.

BY JIM DUFFY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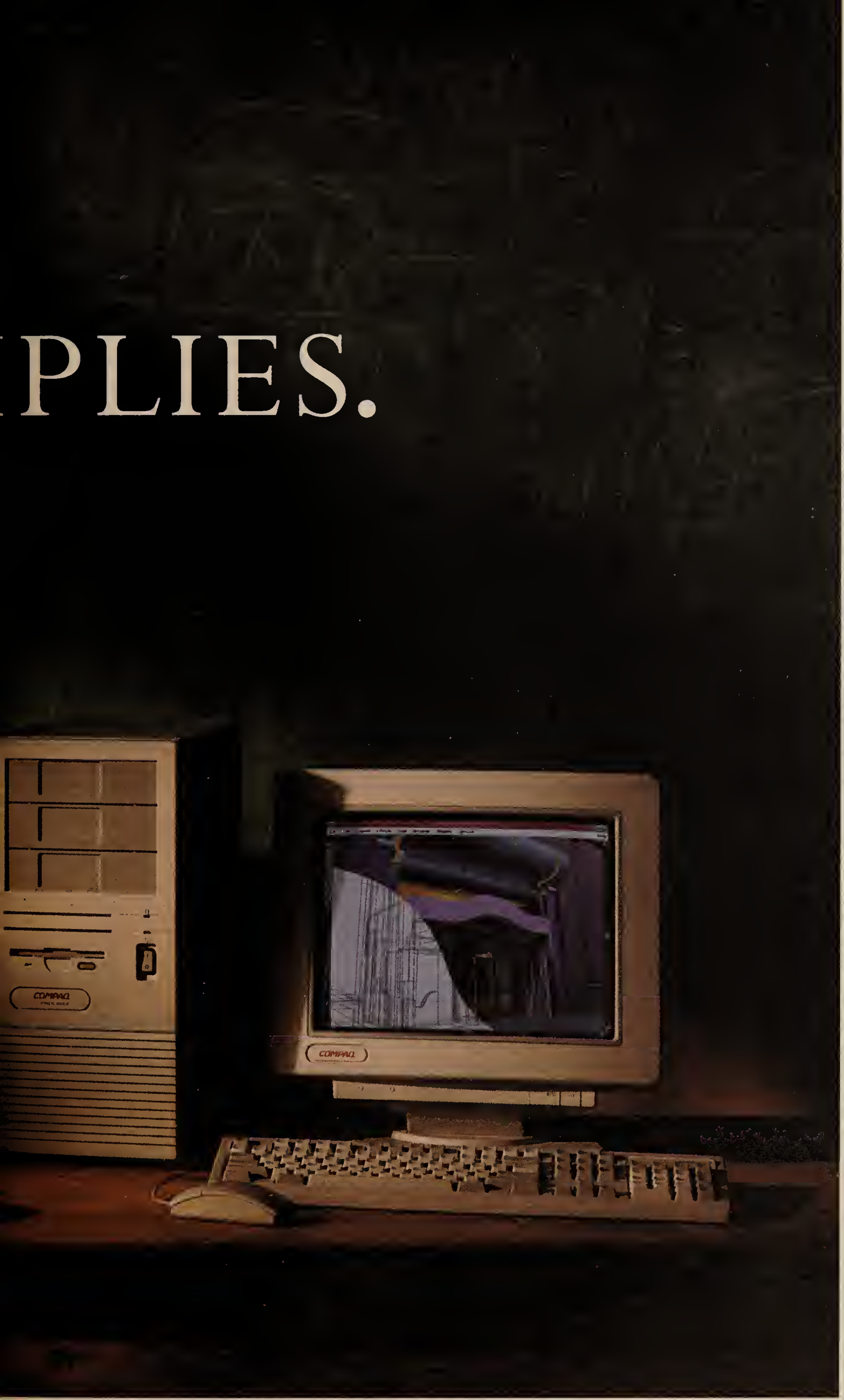

with an integrated monitor. But despite the extremely small footprint, it's anything but meek.

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Modem

Continued from page 43

shirt pocket, for that matter. The Megahertz modem is lighter than the other two modems and does not have any LEDs, which reduces power consumption on portable computers.

If cost is the primary concern, a V.32bis modem can be had for as little as $269, from Cardinal Technologies. However, you get what you pay for. The 14400V32bis only marginally supported the asynchronous applications and did not support synchronous at all. In fact, many of the inexpensive V.32bis modems do not support synchronous transfers and offer less than stellar performance.

In the V.32bis arena, there are many modems that can handle most end-user applications. For sites characterized by synchronous file transfers, the choice is further clouded because so many of the modems offer more than adequate performance. However, if price is a consideration, the Hayes Microcomputer Products Optima 144, Practical Peripherals PM14400FXSA V.32bis and Zypcom Z32b-SX modems are the least expensive of the bunch.

In the asynchronous file transfer arena, the choice is clearer. The Western Datacom Worldcom, Zypcom Z32b-SX and the ZyXEL U-1496E+ were the best of the pack.

The Zypcom Z32b-SX took top honors. For a reasonable price that includes fax capability, the Z32b-SX offered the best performance of the bunch. The Z32b-SX costs only $549 and has a two-year warranty.

➾ Briere is president of TeleChoice, Inc., a Verona, N.J., consultancy specializing in strategic planning and analysis of intelligent nets, services and applications. He can be reached at (201) 239-0700 or on MCI Mail at DBRIERE (445-4690).

DCE

Continued from page 52

"It all comes down to the issue of OMG's CORBA standard kind of being the adopted standard for the underlying object framework," said HP's Robinson. "And the individual sponsors of OSF — IBM, HP and Digital — all have their own program to implement: [CORBA]. We didn't see that as an appropriate role for OSF."

Many industry analysts and consultants believe the OSF's about-face on the object framework renders the entire DME effort meaningless or irrelevant. Contrary to OSF's claims, few observers are optimistic that NMO and distributed services will be widely licensed by vendors and, thus, widely deployed by end users.

The reason, again, is that vendors are already offering their own NMO and distributed services software. HP, for example, already offers NMO code in OpenView 3.X. And DEC and Microsoft are working on a license management system that DEC officials claim will offer functionality beyond what OSF's license manager provides.

Users are not too choked up about the DME's apparent demise, however. They applaud the effort but maintain that it was too ambitious.

"The solution you can be most enthusiastic about is the one that's available to implement today," says 3M's Norton. "Again, we remain committed to the principles and are generally supportive of the OSF effort."

MCI's Hoffman says undertaking standards work is very difficult. "It takes time, and by its very nature is political. It is not as deterministic as we would like it to be. As a result, I think that trying to nail down a specific time frame is difficult."

So it's a case of 'You win some, you lose some' with OSF's DCE and DME. It looks as if users will forge ahead on the DCE front and count on DCE-compliant products from most of the major vendors and interoperability strategies from others. But for managing a distributed environment, users will have to continue to rely on vendor-supplied products that are advertised but not necessarily proven to fulfill OSF's original mission for DME.

Caveat emptor.

➾ Duffy is senior editor of Enterprise Internets for *Network World.*

Help desk

Continued from page 2

Can you recommend any home study materials that will prepare me for Novell, Inc.'s Certified NetWare Engineer (CNE) exam? I am a computer software consultant and have some experience with NetWare.

Donald Lawson, Baltimore

Ronald Nutter, escalation manager of 900 Support, a 24-hour, seven-day-per-week NetWare technical support company in Lake Oswego, Ore., replies:

You can study for the CNE exam using Novell's student kit, which contains a set of manuals used to supplement Novell certification courses and some of the NetWare systems administrator manuals. This kit costs approximately half the price of each Novell certification class. Check with any Novell Authorized Education Center for more information on the student kit.

You can also download the programs, flash card and CNEquizzer, from CompuServe's NOVUSER forum. These files contain questions similar to those on the actual CNE exam. In addition, you might want to get the CNE Assessment Disk, which also contains sample test questions. You can get this disk from a Novell Authorized EducationCenter or by downloading the file, CERT2.EXE, from CompuServe.

Carl Reid, computer systems analyst and director of NetTECH, a Jersey City, N.J.-based computer consulting company, adds:

I recommend purchasing two books that will help you study for the CNE exam: *Maximizing Novell NetWare 3.11* ($45) by John Jerney and Elna Tymes (New Riders Publishing), and *NetWare Server Troubleshooting and Maintenance* ($35) by Edward Liebing and Ken Neff (published by LAN Times).

I also recommend getting a book on telecommunications. McGraw Hill, Inc. offers a wide selection of computer and local-area network technology books.

Remember, though, that a solid understanding of DOS, microcomputers and LAN/telecommunications technologies is essential for studying for the CNE exam on your own.

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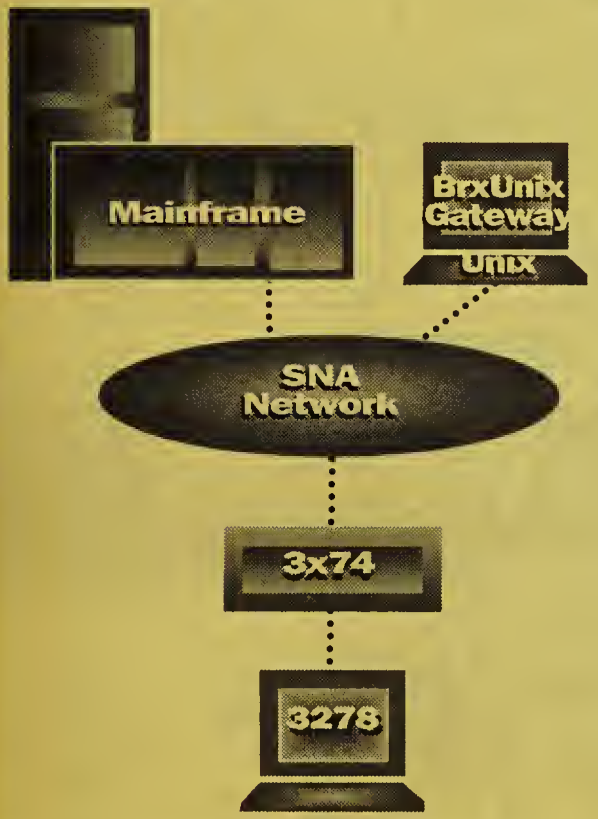

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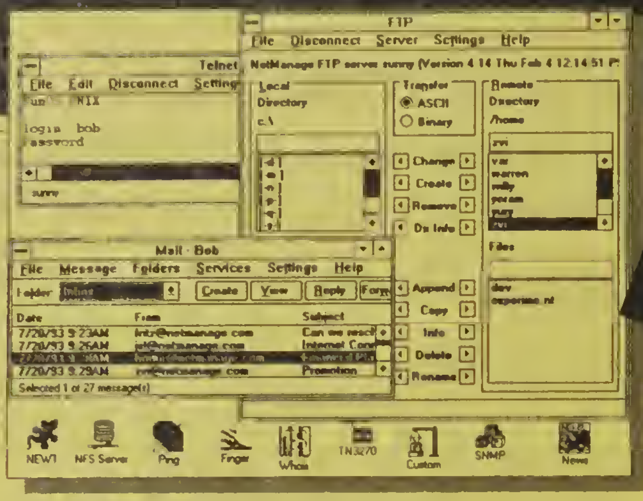
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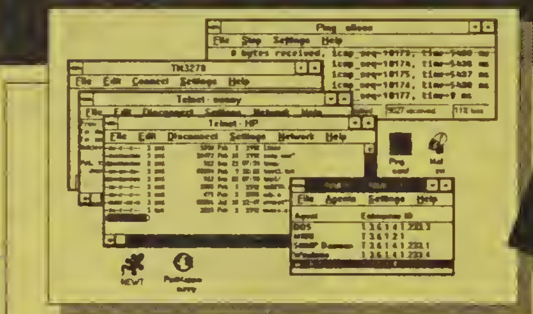

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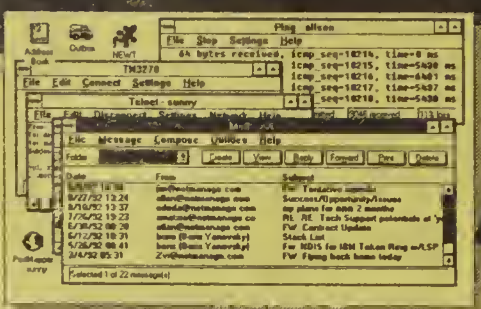

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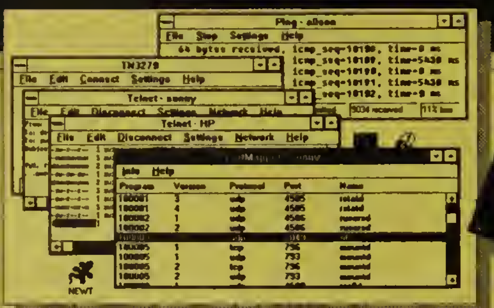

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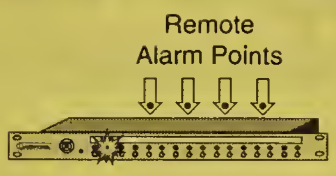

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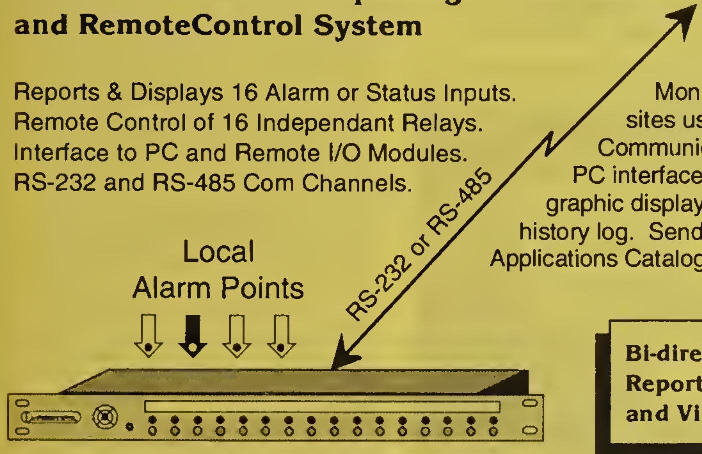

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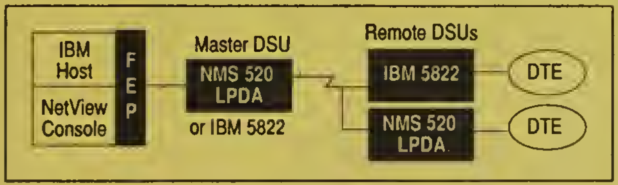

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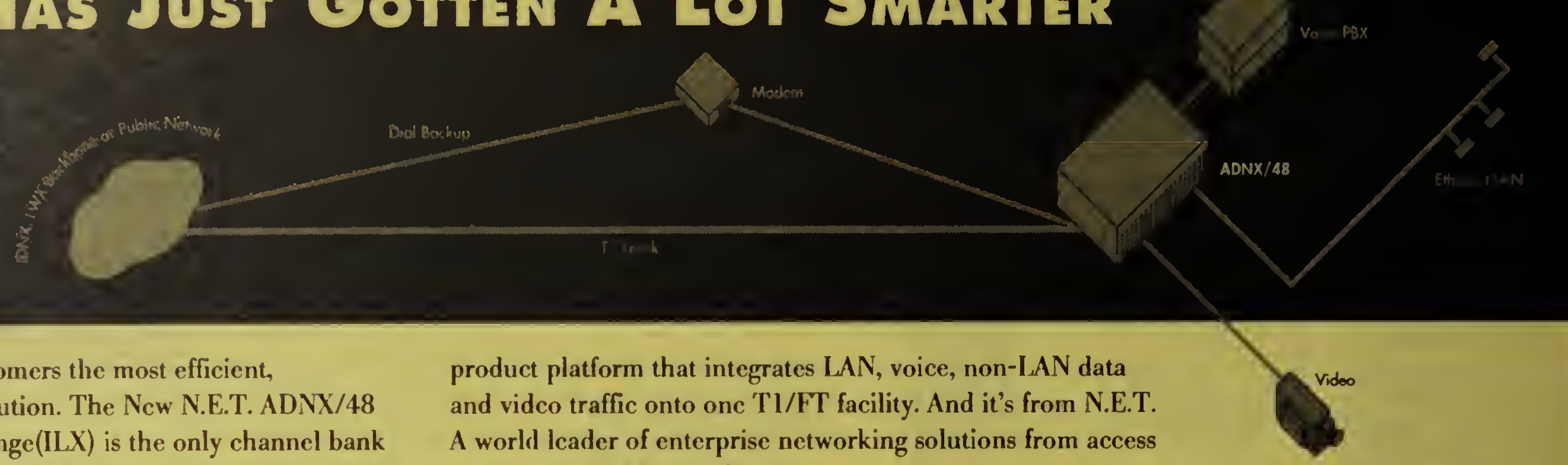

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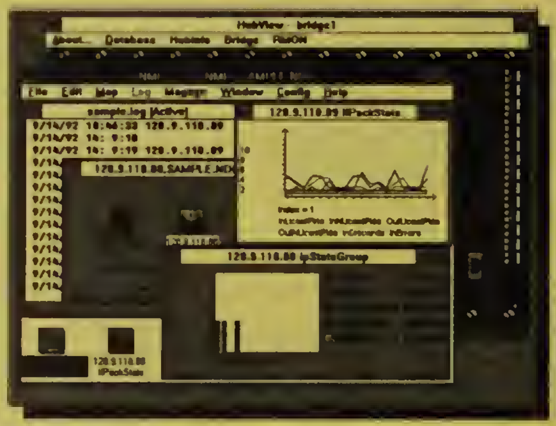

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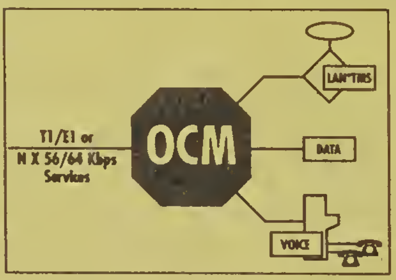

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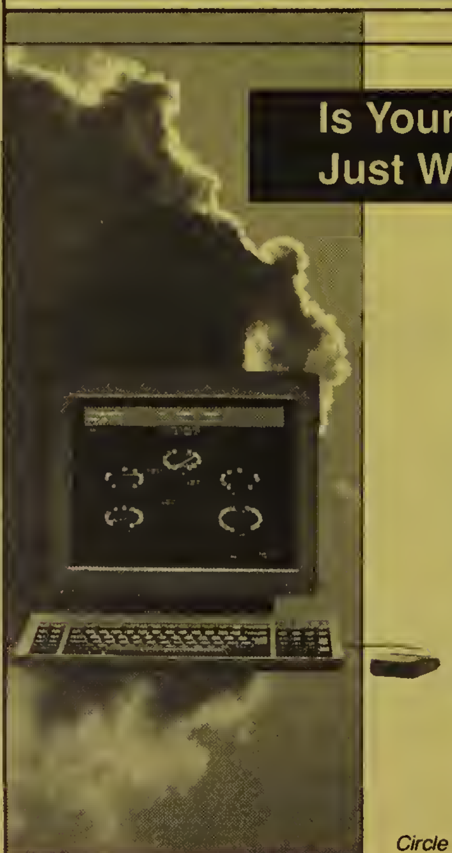

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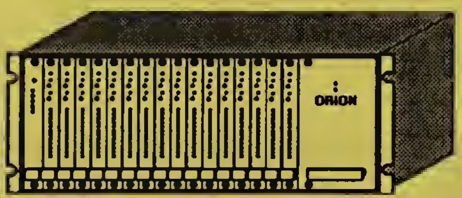

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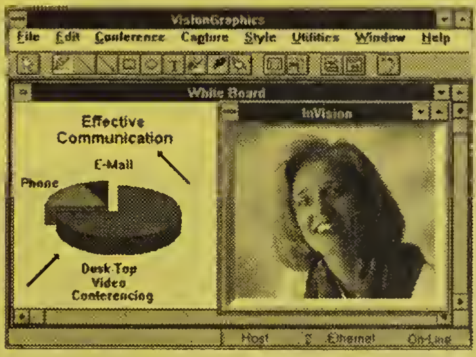

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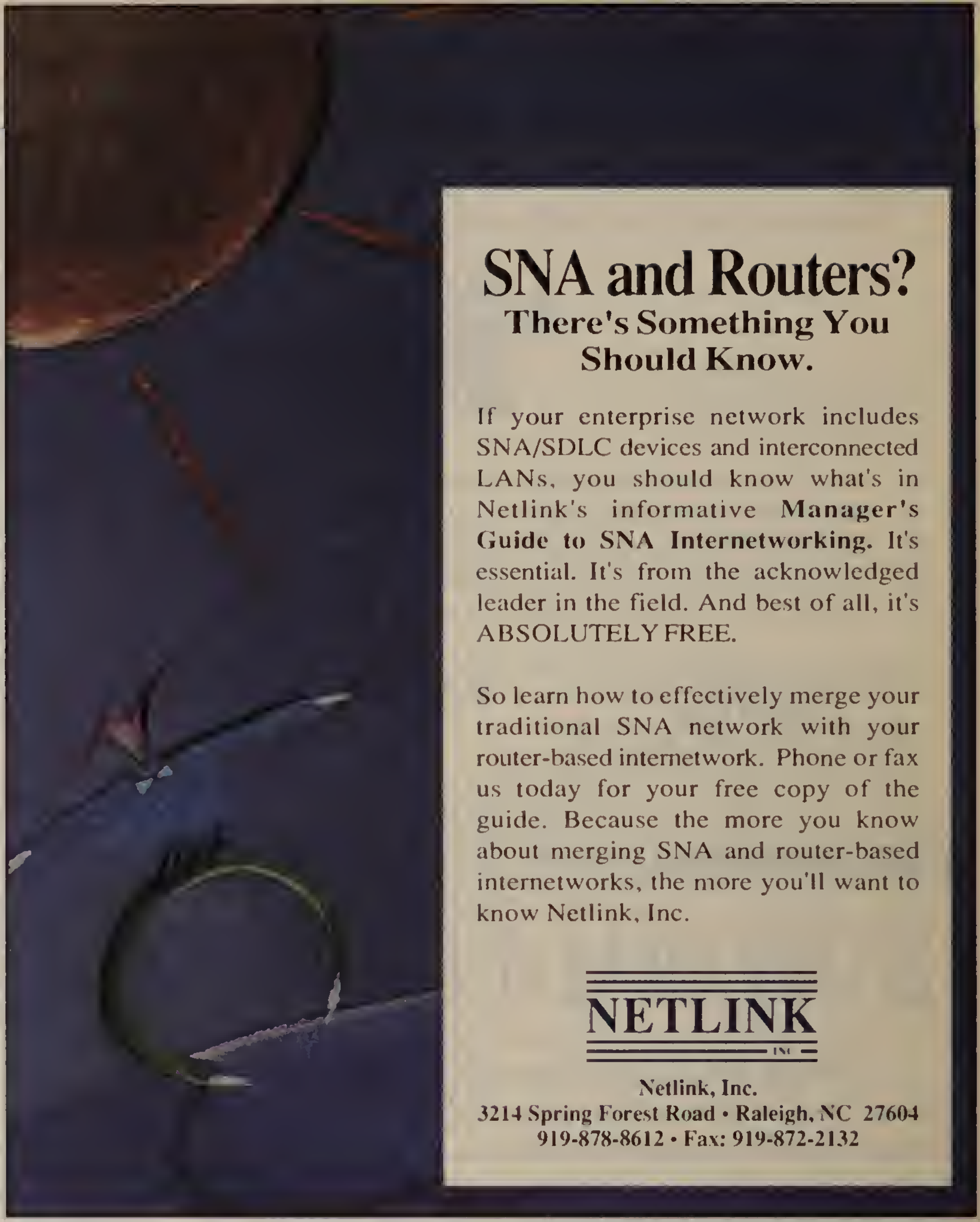

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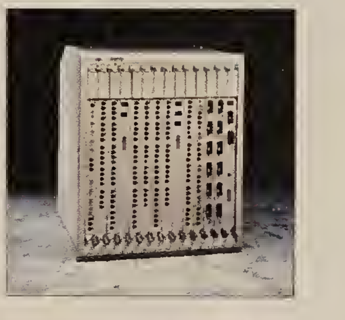

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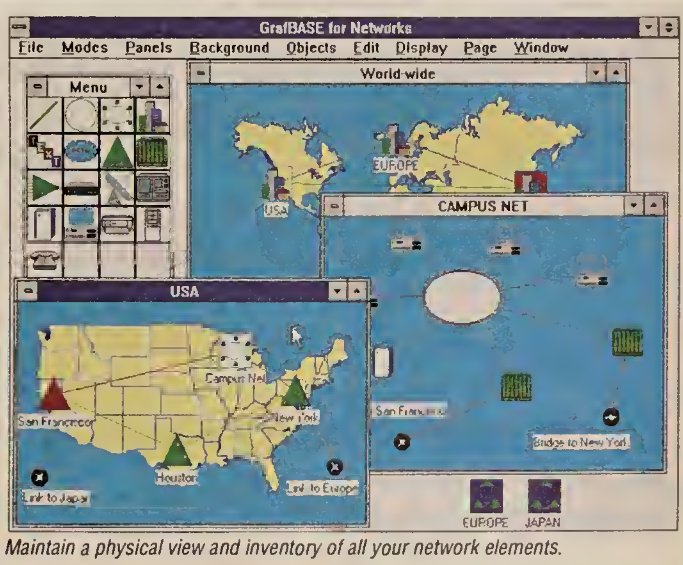

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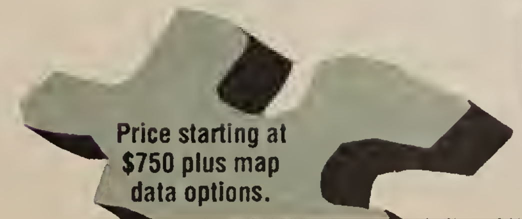
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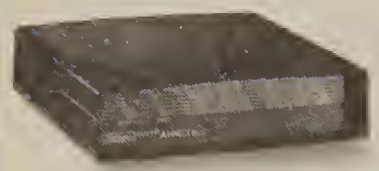

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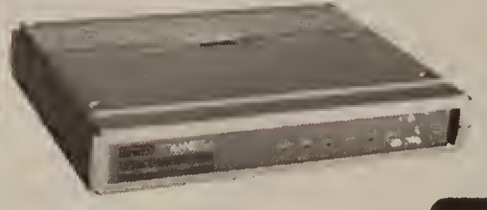

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Cabletron

Continued from page1

token-ring, Ethernet, Fiber Distributed Data Interface and Asynchronous Transfer Mode (ATM) networks, offering users software-based routing, bridging and switching services to tie all net segments together across a single 4G bit/sec passive backplane.

"Unlike our rivals, which are rolling out devices with multichannel backplanes and a promise for future high-speed switching and ATM capabilities, we will deliver that next-generation functionality up front," Skubisz said. "The device will be based on our Plus Architecture and support hundreds — not tens — of LAN segments."

As part of the Plus Architecture, all Cabletron hubs use the Intel Corp. Reduced Instruction Set Computing-based i960 processor, which makes it easier to integrate the stackable and modular products.

LAN Builder modules will house at least one i960 chip, which will support software developed by Cabletron that provides routing, bridging or local net switching functions, depending on how the module is configured. Nodes attached to the module will communicate through the processor, freeing up the backplane for other traffic and eliminating the need for external devices or dedicated modules to handle those tasks.

That integrated bridge/router/switch functionality will be based on Cabletron's Secure Fast Packet Switching (SFPS) technology. SFPS translates packets into fixed-length cells that are then switched to their destination across the 4G bit/sec backplane.

If an Ethernet node on a net attached to the LAN Builder needs a switched link to a token-ring or ATM node, for example, the traffic will enter the Ethernet module and be converted into a cell somewhat larger than a standard 53-byte ATM cell. Source and destination addresses will be combined into something like a virtual channel identifier and the traffic will be switched to the token-ring or ATM port where the cells are reassembled into the appropriate format.

If switched connections are not needed, modules can also be configured to perform traditional bridging and routing functions.

Since the LAN Builder supports both ATM and traditional LANs, Cabletron has devised a management scheme that can control any type of connection, including links between packet- and cell-based nets.

The company will roll out an Automated Connection Management Server (ACMS), a Unix workstation product that will define the traffic transport rules for the network and enable users to build so-called virtual networks that link users on different physical segments in a logical manner.

Several ACMSs can be used in a network, depending on the number of LAN segments and devices. Each ACMS can control access for a portion of the network, eliminating the need for SFPS-enabled modules to maintain complex routing tables.

The server will determine how much bandwidth will be allocated to every end connection and the most efficient path across the net. It will even prioritize calls and determine the most cost-effective WAN service to use.

"The ACMS defines the network rules and enforces them in a real-time basis," Skubisz said. "Net managers only need to set up the rules once and the ACMS takes over from there. It may be the most important piece of the net management puzzle for these increasingly complex nets."

This intelligent call processing and control is made possible because ACMS uses artificial intelligence features from the Spectrum net management system, he said.

ACMS eliminates the typical overhead created when traffic flows across an enterprise network since the packet does not need to be processed at every device it passes through in order to reach its destination.

The ACMS will work in conjunction with Spectrum to provide net managers with a comprehensive view of their entire enterprise, Skubisz said.

Cabletron has also eased management by allowing LAN Builder modules to compile and process management information on all nodes and networks connected to them via support for the Simple Network Management Protocol and Remote Monitoring Management Information Base.

Administrators can configure one LAN Builder module as a master management module that will compile information from all other modules.

Analysts labeled Cabletron's strategy as ambitious.

"Cabletron is promising a tremendously high level of integration not only on the hardware side, but in terms on net management, which will require sophisticated software," said Todd Dagres, vice president of data communications at The Yankee Group, a Boston-based consultancy.

"SynOptics [Communications, Inc.] went first with a next-generation announcement that bombed because many of the next-generation features were not rolled out in the initial release," he added. "If Cabletron can deliver on all this modularity, distributed intelligence, net management, bridge/routing and switching, they will be tough to beat."

Cabletron will officially announce LAN Builder and its components in the first quarter of next year. While its modules will likely be more expensive than products from rivals because of the vast amount of integrated intelligence and processing, Cabletron contends the overall system will be less expensive because users will not need to buy stand-alone routers or waste hub slots with management modules.

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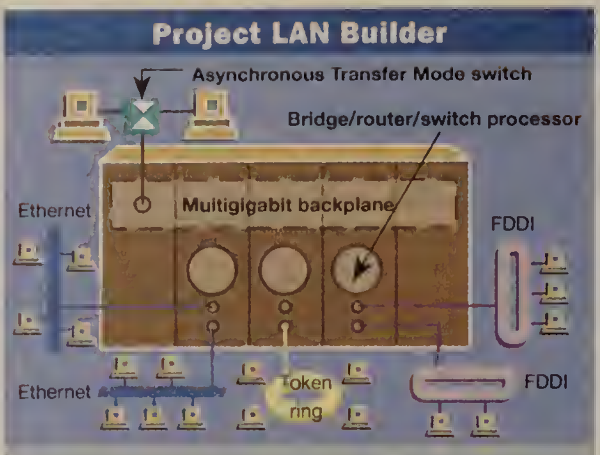
Project LAN Builder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Cabletron's next-generation hub will feature modules that support LAN and workstation connections and handle all management, switching and routing locally, obviating the need for modules or external devices.

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Second-class postage paid at Framingham, Mass., and additional mailing offices. *Network World* (USPS 735-730) is published weekly, except for a single combined issue for the last week in December and the first week in January by Network World, Inc., 161 Worcester Road, Framingham, Mass. 01701-9172.

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Microsoft

Continued from page 8

hardware architectures made it impossible to perform database loads and dumps between Intel and RISC systems.

The product can run on either Windows NT or Windows NT Advanced Server and will be available in January for $2,495 for an unlimited-user server license.

Also last week, Microsoft said it expects SQL Server for NT support to be available within the first quarter of 1994 from Information Builders, Inc., makers of the EDA/SQL middleware product. Such a move would allow SQL Server users to connect to more than 50 relational and nonrelational database and file systems supported by EDA/SQL.

Microsoft also hinted it would diverge from the replication path that SQL Server technology partner Sybase has taken with the release of the Sybase Replication Server. Microsoft said it would incorporate its own replication services into its forthcoming Cairo operating system designed as a replacement for Windows, but would likely support Replication Server in the meantime.

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IBM

Continued from page 1

generic applications that will let users collect remote data and integrate it into their LANs or SNA network," said Tom Nolle, president of CIMI Corp., a Voorhees, N.J., consultancy. "IBM has had wireless data collection applications in the past, but they had to be highly customized for individual users."

ATM PRICING

IBM also intends to drive its ATM products out the door in '94, but until now, had not been forthcoming with product pricing.

According to Don Haile, general manager of IBM's networking software division, the first ATM PC adapter, which will support speeds up to 25M bit/sec, will be available sometime near June for $1,000 to $1,200.

HAILE

A 100M bit/sec adapter for servers will also be available by midyear for about $3,000. A 155M bit/sec interface will be available late in 1994 or early 1995, which will cost more, but pricing has not yet been set.

"We expect ATM product prices to be high initially and drop to where users will see the 25M bit/sec adapter sell for $500 by 1995," Haile said. Pricing for the previously announced ATM Transport Network Node and intelligent hub were not discussed.

Antoine Granatino, division director of IBM's campus networking division, also revealed that IBM is developing an ATM interface for the 3745 front-end processor. Under the existing plan, only the 3172 Interconnect Controller was to receive an ATM interface.

WIRED LANS

In the wired LAN arena, IBM executives said 1994 would see a number of high-speed connectivity

MCI

Continued from page 1

services on the drawing board include network, local-area network, router and data center management, as well as disaster recovery services.

The value-added services are part of an aggressive MCI strategy to take a big chunk of the emerging market for virtual data networks. Today, AT&T dominates the private-line arena but, Weichselbaum said, that market will remain flat in coming years.

As LAN interconnection needs grow, MCI believes it will be well-positioned with its family of HyperStream virtual data services.

But to keep the revenue stream growing and keep margins up, the carrier wants to provide more than just transmission capacity, and that is where the value-added services come in. Already this year, MCI has launched videoconferencing and transaction processing services.

During the next few years, other protocol, applications and professional services will be rolled out to users, regardless of the underlying network facilities they are buying, said Ray Kang, MCI's senior product manager for the HyperStream packet services.

With protocol services, MCI will take over transmission and routing, as well as administration of IP, APPN and IPX networks.

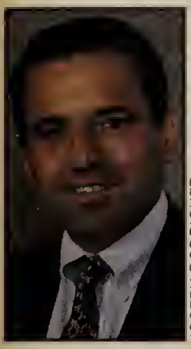
The IP service, for example, would support such facilities as the File Transfer Protocol and the Simple Mail Transport Protocol.

"Our handling of these protocols would free you from dealing with glorified plumbing issues," Kang announcements. Aside from the ATM hub, which is scheduled to be available midyear, the most significant of these new products will be an IBM Token-Ring switching module for the 8250 hub.

IBM did not make it clear whether the switch would be added to the ATM 8250 or another model of the hub.

The company is expected to announce a larger 8250 early next year that doubles the current capacity of the largest 8250 (*NW*, Oct. 4, page 1).

The switching module would let users further segment their LANs and designate bandwidth to individual users that need it the most, said John Pickens, an SNA analyst with the Mayfield Fund, a venture capital firm in Menlo Park, Calif. "It will be important to users beginning to move toward larger LAN applications, such as multimedia."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GRANATINO

Additionally, Haile said IBM hopes to roll out 100M bit/sec AnyLAN token-ring products next year. IBM and Hewlett-Packard Co. are working on developing 100Base-VG products for both Ethernet and token-ring environments.

Ideally, the 100M bit/sec ring would give current 4M and 16M bit/sec token-ring users a migration path to other high-speed LAN technologies, such as ATM, without requiring users to toss out existing equipment.

Also on tap for LAN users is a more powerful 8209 LAN Bridge. The new 8209 will be based on an Intel Corp. 80486 platform and have at least four ports, IBM said. The existing 8209 only supports two ports.

For Unix software distribution, IBM will bring NetView Distribution Manager to its AIX/6000 workstations. Called NetView DM/6000, the application will let users distribute software to AIX clients from a central AIX workstation. The software will also support software updates distributed from a mainframe.

BOYLE

Bill Warner, vice president of IBM's enterprise management division, said the company will also be bringing over LAN Network Manager (LNM) and LAN Management Utilities (LMU) to the NetView/6000 management platform.

LNM will let NetView/6000 gather network problem, status and diagnostic information from IBM Token-Ring LANs.

Today, NetView/6000 monitors Ethernet-based LANs. LMU runs on OS/2 machines and can feed performance and systems management information to LNM from OS/2 and NetWare servers.

Finally, IBM continues to proliferate CICS, this time by giving NetWare users access to CICS applications on IBM mainframes and Personal System/2 servers.

IBM said it would develop CICS software that will operate on NetWare servers. Initially, the software will only have access, via its NetWare for SAA gateway, to IBM mainframe-based CICS applications. In the future, NetWare users will also be granted access to CICS applications on IBM's AIX and HP's CICS workstations.

"This product will spread CICS influence to the largest segment of the LAN population," Nolle said. "But, more importantly, it gives credence to doing distributed computing in a NetWare environment — an ability NetWare sorely lacks."

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said. As network administrator, MCI would be responsible for handling such details as routing changes.

At the applications level, the carrier is considering such services as multimedia conferencing, on-line directories and software distribution. A multimedia conference would, for example, let sites share whiteboards while participating in voice or video conferences.

Kang said MCI's messaging infrastructure is an ideal vehicle for software distribution; software could be delivered as a file appended to a message. The service would not only aid users in updating workstations and servers across an enterprise network, but would also give software vendors a new approach for marketing their wares.

Directory services would support on-line yellow or white pages, as well as private, intracompany applications. Also, the on-line directories would provide new channels for vendors to market products.

MCI could work alone or with other vendors in providing professional services, Kang said. Among other things, he said the company could use its own network management facilities to manage customer networks.

Kang declined to specify exactly how such a service would work or how far into the customer network MCI's management view could extend, although he said it would probably not be to the desktop level. He also said that major network components, such as routers and hubs, would be covered, adding that MCI will announce plans in this area in the near future.

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